The Relationships between Self-Related Perceptions, Motivation, Aspirations and Achievements in an Academic Setting

Amanda Hughes

PhD Thesis
Submitted in partial fulfilment of the requirements of Staffordshire University for the degree of Doctor of Philosophy

October 2011

The Relationships between Self-Related Perceptions, Motivation, Aspirations and Achievements in an Academic Setting

Amanda Hughes
PhD Thesis, October 2011

ABSTRACT

This thesis explores the nature of the self and how the various self-perception constructs – self-esteem, self-concept, and self-efficacy – contribute to academic functioning. The research was undertaken in three stages. The first was designed to examine how the self is represented. Bandura's *Multidimensional Scales of Perceived Self-Efficacy* (1990) and Harter's *Self-Perception Profile for Adolescents* (1988) were utilised to examine the extent to which self-efficacy and competency-related elements of the self-concept are independent constructs. Factor analysis of data provided by secondary school students revealed that when measured using domain-specific measures such as these, self-efficacy and competency self-concept do not represent totally separate, distinct aspects of the self.

The second stage was designed to examine how representations of the self relate to academic performance, intrinsic motivation, and occupational and educational aspirations. Taking account of past academic performance and other factors that might impact on the self-perception–academic outcome relationship, self-efficacy was shown to be a better predictor of these outcomes than either of the other two self constructs. Self-esteem was the least predictive. These findings suggest that self-efficacy and self-concept, but not self-esteem, are important for the development of academic functioning.

The third stage of this research was designed to examine whether interventions can have a positive effect on how the self is represented, and if so, whether this also impacts on academic functioning. This thesis used a widely-used and Government-supported intervention programme to explore this issue in a real-world context. There were positive effects on some aspects of self-concept but not on any other variables. These effects were not associated with any changes in the academic outcomes. The reasons why this intervention did not have a wider impact are explored, and the practical and theoretical implications of the findings are discussed. This research provides a clearer understanding about where educators and education policy-makers should focus their efforts if the aim is to enhance self-related perceptions in school.

To my family and close friends, with love

Acknowledgements

Firstly, I would like to thank the students who participated in this research and the school staff who helped to organise their participation. Without their generosity and positive attitude, there would have been no data to analyse and no PhD Thesis to write.

I am indebted to my supervisors, Professor David White and Mr. David Galbraith for their invaluable guidance, support and encouragement. To say that I could not have done it without you is something of an understatement. I am truly appreciative. Thanks also to Professors Jean Mangan and David Clark-Carter for their expert advice with some of the statistical procedures used in this thesis. I am grateful to my employers, the Institute for Education Policy Research at Staffordshire University, who have financially supported this PhD. I am also grateful for the support of my colleagues within the Institute. Special thanks go to Dr. Kim Slack.

Finally, to my family and close friends, I offer my gratitude for your years of patience and understanding, and your unfailing belief in my ability to achieve. Thank you.

TABLE OF CONTENTS

1 INTRODUCTION: SELF-RELATED PERCEPTIONS EXPLAINED 1
1.1 Defining Self-Perceptions 5
1.1.1 The origins of theories of the self 5
1.1.2 Defining self-esteem, self-concept and self-efficacy 6
1.1.3 Structure, dimensionality and specificity of self-perceptions 12
1.1.4 Treatment of self-esteem, self-concept and self-efficacy in the literature 18
1.2 Formation of Self-Perceptions 18
1.2.1 Determinants of self-esteem and self-concept 19
1.2.2 Determinants of self-efficacy 22
1.2.3 Implications for intervening to enhance self-perceptions 24
1.3 Self-Perceptions as Causal Agents in Human Functioning 28
1.3.1 Theory of self-perception causality 29
1.3.2 Mechanisms by which self-perceptions affect academic functioning 32
1.3.3 Self-perceptions, academic performance and aspirations 39
1.4 The Current Investigation 45

2 PERCEIVED COMPETENCE: A COMMON CORE FOR SELF-EFFICACY AND SELF-CONCEPT? 48
2.1 Introduction 48
2.1.1 Empirical research on the self-efficacy/self-concept distinction 49
2.1.2 The factor structure of the MSPSE and SPPA 52
2.1.3 Research questions 54
2.2 Method 55
2.2.1 Overall design and context for the thesis 56
2.2.2 Sample 57
2.2.3 Measures 66
2.2.4 Data collection procedure 71
2.2.5 Data preparation, cleaning and screening procedures 72
2.2.6 Overview of thesis design and analyses 73
2.3 Results: Self-Perception Factor Analysis 74
2.3.1 Self-efficacy 75
2.3.2 Self-concept 81
2.3.3 Construct validity 85
2.3.4 Aggregate self-efficacy and self-concept 88
2.4 Discussion 95
2.4.1 Self-efficacy factor analysis 95
2.4.2 Self-concept factor analysis 102
2.4.3 Relationship between self-efficacy and self-concept 104
2.4.4 Implications 109

3 DO PERCEPTIONS OF THE SELF PREDICT ACADEMIC FUNCTIONING? 112
3.1 Introduction 112
3.1.1 Research questions 115
3.2 Method 116
3.2.1 Design 116
3.2.2 Sample 116
3.2.3 Measures 117
3.2.4 Procedure 125
3.2.5 Statistical analysis 125
3.2.6 Diagnostic checks 129

3.3 Results **129**
3.3.1 Descriptive statistics 129
3.3.2 Regression analyses 131
3.4 Discussion **147**
3.4.1 Do self-perceptions predict academic outcomes after controlling for prior academic performance, ability and other factors? 147
3.4.2 Which aspect of the self is the most important for predicting academic outcomes? 149
3.4.3 To what extent are the self-perception structures derived from the Chapter 2 analyses valid as predictors of academic outcomes? 157
3.4.4 In conclusion 159

4 THE EFFECTS OF AN INTERVENTION DESIGNED TO ENHANCE SELF-RELATED PERCEPTIONS **162**
4.1 Introduction 162
4.1.1 Research questions 171
4.2 Method **173**
4.2.1 Design 173
4.2.2 Sample 173
4.2.3 Programme implementation 173
4.2.4 Measures 175
4.2.5 Procedure 176
4.2.6 Statistical analysis 176
4.2.7 Diagnostic checks 180
4.3 Results **180**
4.3.1 Effects of intervention on self-perceptions 181
4.3.2 Academic intrinsic motivation 188
4.3.3 Aspirations 189
4.3.4 Academic performance 189
4.3.5 Testing for types of programme implementation 191
4.3.6 Experience of *Go For It!* and reported use of strategies 192
4.3.7 Summary of findings 195
4.4 Discussion **196**
4.4.1 Does the *Go For It!* intervention lead to improved self-perceptions? 196
4.4.2 Which self-perception is more susceptible to intervention? 198
4.4.3 Does the *Go For It!* intervention lead to positive changes in academic outcomes? 199
4.4.4 Reasons why there was limited evidence of significant positive effects 200

5 DISCUSSION AND CONCLUSIONS **206**
5.1 Addressing the Research Questions **206**
5.1.1 How is the self represented? 206
5.1.2 How does the self relate to academic functioning? 211
5.1.3 Does intervention have any effect on how the self is represented? 214
5.2 Educational and Theoretical Implications **217**
5.2.1 Educational implications 217
5.2.2 Theoretical implications 222
5.3 Limitations and Future Directions **227**
5.3.1 Limitations 227
5.3.2 Future directions 233

6 REFERENCES **240**

7 APPENDICES **270**
Appendix A.1 Piloting of Self-Efficacy and Self-Concept Measures 271
Appendix A.2 Self-Efficacy Measure 274
Appendix A.3 Self-Concept Measure 280

Appendix A.4	Comparison of Factor Structures	286
Appendix A.5	Abstract of Paper Submitted to Journal of Personality Assessment	289
Appendix B.1	Wording Changes to the Intrinsic Motivation Measure	290
Appendix B.2	Motivation Measure	291
Appendix B.3	Aspiration Measure	295
Appendix B.4	Occupational Aspiration Classifications	296
Appendix B.5	Regression Sample: Diagnostic Checks	297
Appendix B.6	Regression Sample: Descriptive Statistics and Raw Correlations	299
Appendix B.7	Regression Model Summary Results	304
Appendix B.8	Regression Coefficients and Standard Errors	313
Appendix C.1	*Go For It!* Process Questionnaires	328
Appendix C.2	Intervention Sample: Diagnostic Checks	332
Appendix C.3	ANOVA Summary Results	335
Appendix C.4	Calculating the *Go For It!* Process Score	346

LIST OF TABLES

CHAPTER 2

Table 2.1	Dates of *Go For It!* programme delivery for intervention schools, and dates of testing sessions for intervention and control schools	57
Table 2.2	Characteristics of the full sample (N = 1497)	58
Table 2.3	Missing data characteristics of the psychometric measures: Full sample (N = 1497)	60
Table 2.4	Comparison of the full sample, the self-perception factor analysis sample, and the excluded participants (those not in the self-perception factor analysis sample)	61
Table 2.5	Missing data characteristics of the psychometric measures prior to imputation: Final intervention sample (N = 480)	64
Table 2.6	Characteristics of the full sample, the intervention sample and excluded participants	66
Table 2.7	Bandura's (1990) *Multidimensional Scales of Perceived Self-Efficacy*, with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the self-perception factor analysis sample (N = 778)	68
Table 2.8	The eight competence subscales of Harter's (1988) *Self-Perception Profile for Adolescents* (showing the first statement out of each item pair), with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the self-perception factor analysis sample (N = 778)	70
Table 2.9	Overview of thesis design and analyses	73
Table 2.10	Self-efficacy: First-order rotated pattern coefficients	76
Table 2.11	First-order self-efficacy factors showing the items they are composed of and which original MSPSE subscale the items originated from	78
Table 2.12	Self-efficacy: Second-order rotated pattern coefficients	80
Table 2.13	Self-efficacy: Correlations between first- and second-order factors	80
Table 2.14	Self-concept: First-order rotated pattern coefficients	82
Table 2.15	First-order self-concept factors showing the items they are composed of and which original SPPA subscale the items originated from	83
Table 2.16	Self-concept: Second-order rotated pattern coefficients	85
Table 2.17	Self-concept: Correlations between first- and second-order factors	85
Table 2.18	Bivariate correlations and descriptive statistics between first-order and second-order self-efficacy and self-concept factors	87
Table 2.19	Aggregate self-efficacy and self-concept: First-order rotated pattern coefficients	89
Table 2.20	First-order aggregate factors showing the items they are composed of and which original measure/subscale the items originate from	92
Table 2.21	Aggregate self-efficacy and self-concept: Second-order rotated pattern coefficients	94
Table 2.22	Aggregate self-efficacy and self-concept: Correlations between first- and second-order factors	95

CHAPTER 3

Table 3.1	Summary of self-efficacy, self-concept and self-competence measures used	117
Table 3.2	The Global Self-Worth subscale of Harter's (1988) *Self-Perception Profile for Adolescents* with the subscale reliability (Cronbach's Alpha), means, and standard deviations derived using the regression sample (N = 778)	118
Table 3.3	Harter's (1980, 1981) *Scale of Intrinsic versus Extrinsic Orientation in the Classroom*, with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the motivation factor analysis sample (N = 951)	120
Table 3.4	Motivation factor analysis: Rotated pattern coefficients	122
Table 3.5	Motivation factors showing the items they are composed of and which original Intrinsic/Extrinsic Orientation subscale the items originated from	122
Table 3.6	Summary of self-perception structures	126
Table 3.7	Overview of the regression models	127
Table 3.8	Comparison of adjusted R^2 change and RMSE change values across models/structures following addition of prior academic performance and self-perception variables	132

Table 3.9 The single-construct domain-specific (first-order) self-efficacy and self-concept structures, and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients 134
Table 3.10 The self-esteem and aggregate domain-specific (first-order structures), and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients 135
Table 3.11 The second-order structures, and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients 136

CHAPTER 4
Table 4.1 *Go For It!* units and unit content 164
Table 4.2 Patterns of implementation of *Go For It!* in different schools 174
Table 4.3 Number/proportion of special educational needs/non-special educational needs students by gender: Control and intervention groups (N = 480) 180
Table 4.4 Mean and standard deviation self-perception, motivation and aspiration scores at baseline, post-test, and follow-up for intervention and control groups (standard deviations in parentheses). Figures taken from the full intervention sample (N = 480). 182
Table 4.5 Mean and standard deviation scores for GCSE Mathematics, English and Science: Control and intervention groups (standard deviations in parentheses, full sample N = 480) 189
Table 4.6 Students' perceptions of the programme and reported use of programme strategies 193
Table 4.7 Students' reported use of strategies by 'high delivery' and 'low delivery' groups 194
Table 4.8 Partial correlations between students' reported use of strategies at follow-up and GCSE performance by 'high delivery' and 'low delivery' groups 195
Table 4.9 Overview of significant effects (comparing intervention and control groups) 196

APPENDICES
Table A.1.1 Changes made to the wording of Bandura's (1990) *Multidimensional Scales of Perceived Self-Efficacy* (the specific words changed are underlined) 271
Table A.1.2 Changes made to the wording of Harter's (1988) *Self-Perception Profile for Adolescents* (the specific words changed are underlined) 273
Table A.4.1 Comparison of first-order factor structures: The self-efficacy first-order structure, self-concept first-order structure, and competency first-order structure compared to the original MSPSE and SPPA structures, with Cronbach's Alpha reliabilities 286
Table A.4.2 Comparison of second-order factor structures: The self-efficacy second-order structure, self-concept second-order structure, and competency second-order structure compared, indicating which first-order factors represent which second-order factors, with Cronbach's Alpha reliabilities 288
Table B.1.1 Changes made to the wording of Harter's (1980, 1981) S*cale of Intrinsic versus Extrinsic Orientation in the Classroom* (the specific words changed are underlined) 290
Table B.4.1 The National Statistics Socio-Economic Classification (NS-SEC) eight-class 'Analytic' codes and how they map on to the 'nine-class' codes used in this study 296
Table B.6.1 Pearson's correlations between control variables, self-esteem and academic outcomes, with means, standard deviations and Total N 299
Table B.6.2 Pearson's correlations between self-perception and control variables, and means and standard deviations for the self-perception variables 300
Table B.6.3 Pearson's correlations between self-perception variables, self-esteem, prior academic performance and academic outcomes 302
Table B.7.1 Hierarchical regression comparing the viability of the various self-perception structures for predicting self-esteem (N = 689) 304
Table B.7.2 Hierarchical regression comparing the viability of the various self-perception structures for predicting educational aspirations (N = 677) 305
Table B.7.3 Hierarchical regression comparing the viability of the various self-perception structures for predicting occupational aspirations (N = 579) 306
Table B.7.4 Hierarchical regression comparing the viability of the various self-perception structures for predicting Independent Mastery Motivation (N = 521) 307

Table B.7.5	Hierarchical regression comparing the viability of the various self-perception structures for predicting Internal Criteria for Success Motivation (N = 521)	308
Table B.7.6	Hierarchical regression comparing the viability of the various self-perception structures for predicting Preference for Challenge Motivation (N = 521)	309
Table B.7.7	Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE Mathematics (N = 427; control sample only)	310
Table B.7.8	Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE English (N = 421; control sample only)	311
Table B.7.9	Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE Science (N = 433; control sample only)	312
Table B.8.1	Unstandardised (B) and standardised (beta; β) coefficients, with robust standard errors, showing which self-perception factors predict which outcomes (standardised coefficients in parentheses; robust standard errors in italics)	313
Table C.3.1	MANCOVA results for self-efficacy: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	335
Table C.3.2	MANCOVA results by gender for self-efficacy: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)	336
Table C.3.3	MANCOVA results for self-concept: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	337
Table C.3.4	MANCOVA results by gender for self-concept: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)	338
Table C.3.5	MANCOVA results for domain-specific (first-order) self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	339
Table C.3.6	MANCOVA results by gender for domain-specific (first-order) self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)	340
Table C.3.7	MANCOVA results for second-order self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	341
Table C.3.8	MANCOVA results by gender for second-order self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)	342
Table C.3.9	ANCOVA results for self-esteem, for full sample and by gender: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	343
Table C.3.10	MANCOVA results for intrinsic motivation: Baseline vs. post-test and Baseline vs. follow-up (N = 426)	343
Table C.3.11	ANCOVA results for educational and occupational aspirations, for full sample and by gender: Baseline vs. post-test and Baseline vs. follow-up	344
Table C.3.12	Univariate ANCOVA results for GCSE performance, for full sample and by gender	345
Table C.4.1	Principal components analysis of follow-up intervention process questions: Rotated pattern coefficients	346

LIST OF FIGURES

CHAPTER 1

Figure 1.1	Pictorial representation of Bandura's theory of triadic reciprocal causation. Adapted from Bandura, 1997, p. 6.	22

CHAPTER 2

Figure 2.1	Self-efficacy factor analysis: Hierarchical model of first- and second-order factors	99
Figure 2.2	Self-concept factor analysis: Hierarchical model of first- and second-order factors	100
Figure 2.3	Aggregate self-efficacy and self-concept: Hierarchical model of first- and second-order factors	101

CHAPTER 4

Figure 4.1	The *Go For It!* Self-Talk Cycle	165
Figure 4.2	Close Friendship Self-Concept mean scores for male mainstream students: Baseline vs. follow-up	184
Figure 4.3	Close Friendship Self-Concept mean scores for male SEN students: Baseline vs. follow-up	184
Figure 4.4	Romantic Appeal Self-Concept mean scores for male mainstream students: Baseline vs. follow-up	185
Figure 4.5	Romantic Appeal Self-Concept mean scores for male SEN students: Baseline vs. follow-up	185
Figure 4.6	Social Self-Efficacy mean scores for male SEN students: Baseline vs. post-test	186
Figure 4.7	Self-Regulatory Efficacy for Good Conduct mean scores for female SEN students: Baseline vs. follow-up	187
Figure 4.8	Self-Esteem mean scores for male mainstream students: Baseline vs. follow-up	187
Figure 4.9	Self-Esteem mean scores for male SEN students: Baseline vs. follow-up	188
Figure 4.10	GCSE English mean scores for female SEN and mainstream students	190

APPENDICES

Figure A.1.1	An original SPPA item from Harter's (1988) *Self-Perception Profile for Adolescents*	272
Figure A.1.2	Revised SPPA item: Response format 1	272
Figure A.1.3	Revised SPPA item: Response format 2	272
Figure A.1.4	Revised SPPA item: Response format 3	273
Figure A.1.5	Revised SPPA item: Final response format	273

1 INTRODUCTION: SELF-RELATED PERCEPTIONS EXPLAINED

The claim that positive self-perceptions (or self-beliefs) are key elements of a positive and healthy personality has put them firmly on the political agenda. The idea that positive self-esteem, in particular, immunises people against susceptibility to a multitude of social problems has become hugely fashionable (Dubois & Tevendale, 1999; Emler, 2001; Kohn, 1994). In the 1980's, the US state of California established a task force aimed at determining the connection being self-esteem and social responsibility (California Task Force to Promote Self-Esteem and Personal and Social Responsibility, 1990). In the belief that self-esteem is an all-purpose 'social vaccine', the task force sought to enhance the self-esteem of the whole population of California. The view of self-esteem as a social vaccine has become widely popular, not only in the US, but all over the world (Mecca, Smelser, & Vasconcellos, 1989). In particular, there has been a drive to eradicate practices or circumstances that might damage a child's self-esteem "from the precincts of educational establishments" (Emler, 2001, p. 3).

Within the United Kingdom, Local Education Authorities have adopted numerous multi-strand approaches to raising self-esteem in the belief that it fosters good behaviour, improved academic performance and more positive attitudes to education (Midgley, 2008, summarises a wide range of school programmes and research conducted in the UK). This is partly because implicit in Government policy is that for young people to be prepared for society, education needs to promote the development of positive self-beliefs – these are seen as essential for raising standards, furthering learning and employment, and dealing with a range of real world problems (Government White Papers: DfEE, 1999; DfES, 2004; DfES, 2005a). This follows conclusions made by OFSTED (The Office of Standards in Education; 1993), the body responsible for UK school inspection, that positive self-esteem is a prerequisite for an effective school environment. UK Government policy documents also describe research that points to the importance of having positive self-esteem and self-efficacy perceptions for developing educational outcomes and helping students to 'aim high' (DCSF, 2007; DCSF, 2010a). Policy documents also point to self-esteem and self-efficacy as being important determinants of high aspirations and attainment (DCLG/DCSF, 2008), and to low self-esteem as being a 'risk factor' for children and young people, and advocate early intervention to secure positive future outcomes (DCSF, 2010b).

An earlier UK Green Paper suggests that "schools need to offer a setting where all children are valued and encouraged to behave well, where there are clear guidelines for behaviour, teaching is positive, and where damaged self-esteem can be rebuilt" (DfEE, 1997a, p. 81). This document points to the value of using 'Circle Time' – a widely used teaching approach where children gather together to share personal feelings and significant experiences in their life – to help raise students academic performance and "build up group rapport and individuals' self-esteem" (DfEE, 1997a, p. 84; see also DfEE, 1997b). Circle Time explicitly espouses the benefits of raising self-esteem. In other programmes this is less obvious and not directly expressed, although enhancing self-esteem and other self-related perceptions can been seen implicitly in many of these programmes. One such programme is SEAL (Social and Emotional Aspects of Learning). Developed as part of the Department of Education and Skills' strategy for primary and secondary education (DfES, 2005b; DfES, 2007), SEAL is a whole-school intervention widely used in UK schools which is aimed at encouraging students to develop their social and emotional skills in order to effect improvements in learning and behaviour. Enhancing self-perceptions is therefore seen as an important aspect of interventions aimed at improving academic functioning.

The UK Government therefore sees the development of positive self-beliefs, amongst other things (skills and attitudes, for example), as being particularly important for economic well-being and for every child to be healthy, stay safe, achieve, and make a positive contribution to society. They also place a marked emphasis on raising the level of attainment, motivation and aspirations in school, in the belief that this will not only produce personal benefits but make a real contribution to society. Consequently, the raising of self-perceptions has become a major focus in the UK and in 2004 the Government rolled out 'Aimhigher', a national programme operating at national, regional and area levels that incorporates a wide range of activities/courses aimed at increasing participation in higher education. One of the national objectives of Aimhigher is to "improve the attainment, aspirations, motivation and self-esteem of gifted and talented young people aged 14-19" (Aimhigher, 2007). Early Aimhigher projects were typically aimed at increasing levels of self-esteem. Other self-perceptions were not specifically recognised as a focus of attention. More recently, however, the importance of raising self-efficacy has begun to appear in individual regional project objectives (for example, in supporting the transition and progression of Gifted and Talented students in the West Midlands: Aimhigher West Midlands website, 2011).

Educators therefore see the development of positive self-perception as a worthwhile goal, both in and of itself, and as a means of facilitating more positive academic outcomes. Strategies for improving students' self-perceptions have typically become part of individual teachers' day-to-day classroom practice: students are praised when they perform well, not just to reinforce good performance but also so that they feel good about themselves (Brophy, 1981). School-based interventions are appealing. They can reach large numbers of students economically and efficiently when incorporated into school curricula and taught by teachers, and if self-perceptions are indeed key elements of a healthy personality then improving them may not only have personal benefits, but may also prevent a wide range of behavioural, emotional, and social problems (Haney & Durlak, 1998).

Because school experiences constitute a major portion of children's lives, educational researchers are eager to understand the meaning of the self as it is represented in children's minds. Self-perceptions receive a great deal of attention in educational research and there are numerous studies which demonstrate that children who exhibit different self-perceptions exhibit different levels of social, emotional, and cognitive engagement in school. Study of the self dominates psychological understanding of motivation in educational contexts because self-perceptions help to explain the function of the self within the context of school learning (Graham & Weiner, 1996; Pajares & Schunk, 2002). The three most widely studied self-perceptions in this context have been self-esteem, self-concept and self-efficacy. These three constructs are related but theoretically and conceptually different. They will be discussed in more detail later, but in summary self-esteem refers to how one feels about the self: it is "a positive or negative attitude toward a particular object, namely, the self", and "expresses the feelings that one is 'good enough'. The individual simply feels that he is a person of worth." (Rosenberg, 1965, pp. 30-31). Self-concept refers to one's entirety of beliefs about the self and what one can do: it is "the totality of self-knowledge that one possesses about oneself" (Pajares & Schunk, 2001, p. 244). Self-efficacy refers to one's perceived confidence to be able to do things: it is "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3).

There has been a great deal of debate about which aspect of the self is most important for school functioning. This debate has been mainly concerned with the distinction between self-esteem, self-concept and self-efficacy constructs and the extent to which each is related to academic performance. Early studies suggest that self-esteem has a causal influence over academic performance, although this has now been questioned (Baumeister, Campbell, Krueger, & Vohs, 2003). There is a basic premise that both self-efficacy and self-concept play a causal role in enhancing students' academic performance as well as in influencing intrinsic motivation (Bong & Skaalvik, 2003). However, there is some debate as to which construct more accurately predicts these outcomes. Current evidence suggests that self-efficacy has predictive advantages for academic tasks that are familiar and precisely specified (Mone, Baker, & Jeffries, 1995; Pajares & Johnson, 1994). There are also questions about the role of self-percepts in relation to post-compulsory schooling outcomes, such as educational and occupational aspirations. Questions remain to be answered, therefore, about whether self-perceptions act as causal agents in academic functioning and about which self-perception construct has the most beneficial effect on such functioning. There are also questions about whether it is possible to actually manipulate self-perceptions. Skaalvik (1997a), for example, has suggested that because of how self-esteem and self-concept are formed (typically through environmental experiences that are heavily dependent on social and cultural values), they are relatively stable constructs and not particularly susceptible to intervention. Self-efficacy, on the other hand, is more susceptible to change because it is formed differently, typically through mastery experiences of the task at hand (Bandura, 1997).

Despite the substantial amount of research that has been devoted to exploring self-perception constructs, the scientific study of self-concept and self-esteem in particular, has been plagued by a variety of conceptual and psychometric problems. For example, there have been problems with defining self-esteem and self-concept, and the conceptual differences between the two constructs are not always made explicit in the literature, with the terms often being used interchangeably (Maclellan, 2005; Skaalvik, 1997a). In general, self-efficacy has been more clearly defined, although there are still questions to be asked about the nature of the construct. There is also some theoretical debate as to whether self-concept and self-efficacy constructs are actually separate entities – it has been suggested that the competency components of academic self-concept are actually equivalent to self-efficacy judgements and that self-concept may actually subsume self-efficacy perceptions (Bong & Skaalvik, 2003). Issues of mismeasurement have also plagued research in all three areas, with a particular concern being the level of specificity at which self-concept and self-efficacy should be measured.

This thesis therefore looks at the relationships between self-esteem, self-concept and self-efficacy in an educational context. This chapter provides the background to these three self-perception constructs and is essentially about defining their nature and how they relate to academic functioning. Firstly, definitions of the separate aspects of the self are discussed. Secondly, this chapter looks at how self-concept, self-esteem and self-efficacy are formed and whether they can be manipulated, and discusses how this might impact on interventions designed to enhance self-perceptions. Next, this chapter looks at self-perceptions as causal agents in academic functioning. It discusses the theory of self-perception causality, examines the mechanisms by which self-perceptions might affect academic functioning, and looks at their utility for predicting and influencing future academic behaviours and achievements. Finally, the form and structure of the thesis is outlined. This introduces the reader to the aims and objectives of the research and provides an overview of each subsequent chapter. This chapter is therefore primarily concerned with setting the context, purpose, and scope of the thesis.

1.1 Defining Self-Perceptions

1.1.1 The origins of theories of the self

Philosophers and others have been talking about the self since the advent of written history and modern day theories of self-perception have their roots in historical conceptions of the self (Hattie, 1992; Pajares & Schunk, 2002). Arguably, the most influential of these is that presented by James in his seminal book *Principles of Psychology* (James, 1890/1963).

James distinguished between the ‘I’ self (or the *self-as-knower*) and the ‘Me’ self (or the *self-as-known*). The ‘I’ is the active thinking processor – the self that is doing all the thinking and living, the self that is the seat of experience – and is a core construct within the person. The ‘Me’ is the self as an object one can think about and reflects the structure of experience. James saw the ‘Me’ – the *known-self* – as being comprised of many ‘Me’s’ or ‘constituents’ which together reflect a person’s overall self-evaluation or *self-concept*. These constituents include the material self, the social self, the spiritual self, and the pure ego. James saw these as being arranged in a hierarchy according to their worth. The material self was seen as the least precious, the social self more so, the spiritual self even more so, and the pure ego – personal identity – as the most precious of all. For James, the material and social selves are comprised of multiple material and social selves. Associated with these selves are the feelings and emotions they arouse (*self-feelings*), the actions they prompt (*self-seeking*: providing for the future as opposed to maintaining for the present), and self-defence (or *self-preservation*). The 'Me' therefore reflects a sense of self which is formed from our various experiences, social encounters, and environmental interactions.

Central to James's theory of the self was his conceptualisation of self-esteem and it is widely accepted that his is the oldest recorded definition of this construct (Mruk, 2006). James wrote "…our self-feeling in this world depends entirely on what we *back* ourselves to be and do" (p. 310). He developed a formula such that:

$$\text{self-esteem} = \text{success} \,/\, \text{pretensions}$$

In essence, James considered self-esteem as the ratio of an individual's actualities (or achievements) to their potentialities (or expectations, i.e. their hopes, desires and aspirations) which could be improved by increasing successes, avoiding failures or, in the face of failure, by lowering expectations (Baldwin & Hoffman, 2002; Emler, 2001; Mruk, 2006). James therefore defined self-esteem and self-concept in terms of action, particularly action that is successful or 'competent'. He stressed, however, that self-esteem/self-concept cannot be predicted purely from objective assessments of success or failure and that it is *competence in areas deemed important* to the individual, rather than their general or overall competence, that determines whether success (or failure) has meaning for a person. James's ideas about the self-system form a basis for subsequent developments in self-esteem and self-concept theories. Not only did he conceive of the self as a total representation of one's self-knowledge, which is typical of current representations of self-concept, he anticipated the multidimensional and hierarchical nature of self-concept that was to be a major focus for later theories. Furthermore, James's view of self-esteem and self-concept in terms of competence and importance represents a major school of thought on the topic and is still very much alive today. James's representation of the self in terms of competence, and as both multidimensional and hierarchical, is also characteristic of self-efficacy, a relatively recently theorised self construct.

1.1.2 Defining self-esteem, self-concept and self-efficacy

Theoretical definitions

Educational research values self-related perceptions because of their assumed importance as a causal or mediating influence over behaviour (this will be discussed in detail in a later part of this chapter). The focus within education is on the contributions of three different types of self-perceptions – self-esteem, self-concept and self-efficacy – to academic behaviours and achievements. Definitions of these three self constructs emphasise different internal components.

Self-esteem and self-concept are two separate but related constructs. Self-esteem is defined as the value that individuals place on themselves. It involves both judgements about a person's own worth, and the feelings associated with those judgements. It is the way individuals perceive themselves and their self-worth. A person with high self-esteem is satisfied with the person they are and meets their own standards as a human being (Coopersmith, 1967; Rosenberg, 1985). This definition bring the notions of values into play – because being 'worthy' is inherently seen as more desirable or 'good' it is seen as a more valued trait to have, whereas being 'unworthy' is viewed as being undesirable, inferior, or 'bad' (Rosenberg, 1985). There can be wide-ranging consequences for children who exhibit low self-esteem (Baumeister et al., 2003; Emler, 2001). They are more likely to have difficulties dealing with problems, be overly self-critical, and become passive, withdrawn and depressed. They are also more likely to be easily frustrated, may hesitate to try new things, may speak negatively about themselves, and often see temporary problems as permanent conditions. In essence, they tend to be pessimistic about themselves and their life. On the other hand, children who exhibit high self-esteem may laugh and smile more, are more likely to have a generally optimistic view of the world and their lives, and tend to find it easier to handle conflicts, resist negative pressures, and make friends. When individuals tap into their self-esteem perceptions they ask themselves questions that revolve around 'How do I feel?', 'Am I happy?', 'Do people like me?' Answers to these questions reveal whether an individual possesses high or low self-esteem.

Self-concept is a more encompassing construct than self-esteem. Broadly defined, self-concept is seen as an overall composite perception of oneself; it is a general, self-descriptive construct that incorporates many forms of self-evaluative feelings, attitudes and aspects of self-knowledge, for example, about our abilities, skills, appearance and social desirability (Jerslid, 1965; Marsh & Shavelson, 1985; West & Fish, 1973). When individuals tap into their self-concept perceptions they ask themselves questions that revolve around 'Am I good at writing?', 'Am I good at driving a car?', 'Do I make friends easily?' Whereas self-esteem refers to feelings about the overall self, self-concept refers to what one thinks and believes about the self in various situations. It is therefore viewed as a multidimensional construct (this will be discussed in more detail later). Self-esteem is viewed as the global aspect of the self-concept (Harter, 1990a; Marsh, 2006; Marsh &

O'Mara, 2008; Rosenberg, 1979), which is also variably referred to as global self-concept or global self-worth. Self-esteem is based more on generalised affective (or emotional) responses to the self, whereas self-concept perceptions are more cognitive and descriptive (Skaalvik, 1997a).

Some theoretical models contend that the self-concept is constructed of cognitive *and* affective (worthiness) components, with the cognitive component being further separated into both self-descriptions and self-evaluations (e.g. Bong & Clark, 1999; Marsh, Byrne, & Shavelson, 1992; Shavelson, Hubner, & Stanton, 1976). For these authors, descriptive and evaluative judgements interact with affective feelings to form the overall self-concept. Self-esteem is therefore seen as a specific component of self-concept. Other models of self-concept, such as that proposed by Harter (1983, 1985a, 1999) see cognitive perceptions and worth as two *separate* components. Harter's model assumes that self-concept is based on cognitive assessments of self-competence in various contextual domains. Self-competence assessments impact on self-esteem judgements (or self-worth judgements as she calls them), but self-esteem is not seen as a specific component of self-concept. Competence is based on succeeding (or failing) at specific actions and behaviours. Self-worth, on the other hand, is more of a feeling or evaluation about the self, rather than a behaviour or outcome and involves subjective appraisals of value which are often based on social and interpersonal foundations. Perceptions of self-worth and competent (or incompetent) behaviour in various domains become important to the self both cognitively and affectively. Harter therefore recognises the importance of affect and its integration with cognitive processes but sees cognitive judgements of self-concept and affective judgements of self-esteem as separate processes (Harter, 1998).

The relationship between self-concept and self-esteem depends on the degree of salience or *importance* one ascribes to the conception of the self in a particular area (domain) (Harter, 1985a, 1986; Hattie, 1992). Hattie (1992) states that: "my acceptance of my concept of self in these two domains is independent of my knowledge and abilities. *Only* if I regard certain aspects of my self-concept as important will there be effects on my beliefs of self-esteem." (p. 54). This is consistent with James' (1890/1963) early ideas about self-esteem. This also links to self-worth theory (Covington, 1992) which suggests that the ability to achieve is highly valued in society, thus people who regard themselves as competent in a particular domain are likely to have positive feelings of self-worth (i.e. more positive self-esteem). Hence, there is not necessarily an automatic correspondence between cognitive and affective aspects of self-concept/self-esteem (Skaalvik, 1997a). For example, if it is not important to someone that they are a good football player then not being able to play football well is unlikely to affect their self-concept or self-esteem perceptions. Therefore, our capabilities and self-perceptions are only a function of the salience we place on them in specific situations or contexts. Skaalvik (1997a) argues that the descriptive/evaluative aspects of self-concept can be distinguished from affective aspects because affective components incorporate feelings of self-worth, refer to approval or disapproval of the self in a given situation, and are formed by *comparing* perceived competence to known values, standards or norms. Thus, the cognitive dimension gives rise to affective as well as motivational judgements. For example, thinking of oneself as smart (cognitive assessment) is likely to give rise to an affective or motivational reaction (Covington, 1984). Such reactions are regarded as motivational in that individuals who regard themselves as smart or competent, and who value smartness, are more likely to make a greater effort to succeed in future endeavours.

Perceived competence is also a primary component of self-efficacy. Self-efficacy is defined as the belief that one has the capability to succeed in specific situations (Bandura, 1977). It is a context-specific judgement of capability to perform a task, or engage in an activity. It is a judgement of one's own confidence which depends mostly on the task at hand and is independent of any socially or culturally assigned values. One of the basic tenets of self-efficacy theory is that individuals who exhibit a strong sense of self-efficacy tend to consider setbacks and difficult obstacles as challenges and therefore generally perform at higher levels than individuals who question their self-efficacy. Individuals who exhibit weak or low self-efficacy often view challenges and setbacks as threats, resulting in low aspirations and weak commitment to goals (Bandura, 1995). Individuals with strong or high self-efficacy tend to set higher goals and remain motivated in the face of failure and disappointment. When an individual taps into their self-efficacy perceptions they ask themselves questions that revolve around 'Can I?' – How well can I write? Can I drive a car? Can I solve this problem? Could I easily make friends? Answers to these questions reveal whether an individual possesses high or low efficacy to accomplish a task/activity.

Self-efficacy is seen as dealing almost exclusively with cognitive perceptions of competence. These cognitive aspects also include an evaluative component. This is because judgements of competence necessitate evaluations of what one is or is not capable of achieving. The emotions that are generated following these evaluative judgements are likely to be different than those generated following self-concept evaluative judgements, however (Bong & Skaalvik, 2003). Affective or emotional self-components are recognised as being associated with cognitive self-efficacy perceptions and low self-efficacy is recognised as causing anxiety and stress (Bandura, 1986). However, self-efficacy researchers see affective/emotional responses as a consequence of self-efficacy perceptions, not as a constituent for defining them, as is the case with self-concept perceptions. For proponents of self-efficacy theory, competent functioning requires harmony between self-beliefs and abilities, skills, and knowledge. Self-efficacy theory does not suggest that accomplishment of difficult tasks is simply a result of believing that we can accomplish tasks beyond our capabilities, but rather that positive competence perceptions help determine how we use our current knowledge and skills. Self-efficacy perceptions are therefore critical determinants of whether one will actually expend effort on a task and persist under difficult conditions. As such, self-efficacy is essentially a motivational construct (Bandura, 1997).

Operational definitions

The distinction between self-perception constructs has not always been made clear in the literature. In their meta-analysis, Hansford and Hattie (1982) identified 15 terms used to denote academic self-concept, with one term being used in two different studies to advocate different theoretical and operational definitions. Shavelson et al. (1976) determined 17 different conceptual dimensions on which to categorise self-esteem/self-concept definitions, and Zirkel (1971) identified 15 definitions that were explicitly cited, and several more that were implicit (Byrne, 1984, 1996; Wylie, 1968, also report similar findings). This general lack of consistency makes it difficult to compare early findings, and the usefulness of the constructs has therefore been called into question (Wells & Marwell, 1976; Wylie, 1974, 1979).

It has been suggested that it is the absence of a clear theoretical distinction for self-esteem and self-concept that is responsible for the failure to provide explicit operational definitions (Scheirer & Kraut, 1979). Other researchers (e.g. Bong & Clark, 1999; Byrne, 1996) suggest the lack of consistency in operational definitions is to some extent due to the proliferation of self-concept/self-esteem measures which incorporate different components (cognitive and affective, for example), or use different frames of reference when asking individuals to make self-concept/self-esteem judgements. For example, measures might call for overall assessments of one's ability in school (e.g. Chapman, 1988), or may use composite scores of individual items which refer to feelings and attitudes towards the self in different areas as well as to perceptions of ability (e.g. Pottebaum, Keith, & Ehly, 1986; Wigfield & Karpathian, 1991). Other measures call for relativistic self-concept judgements in various contexts. These might incorporate only cognitive elements of the self (e.g. Harter, 1982), or they might incorporate affective/motivational as well as cognitive elements (e.g. Marsh, 1990a; Shavelson & Bolus, 1982). Cognitive and affective/motivational aspects of self-concept form separate factors, however (Pietsch, 1999; Skaalvik & Rankin, 1996a; Tanzer, 1996). Therefore, using measures that incorporate all these components may confound our understanding; although questions about whether the cognitive and affective components of the self-concept need to be treated as separate constructs are relatively new. There has been a leaning towards utilising narrower definitions, especially for academic self-concept (e.g. Brookover, Thomas, & Paterson, 1964; Marsh, 1990a). Yet it has been argued that these are restricted definitions that closely approximate academic self-efficacy (Bong & Clark, 1999).

There are, therefore, a multitude of operational definitions of self-concept and self-esteem, and assessment scales are much diversified. Recent operational definitions of self-concept tend to emphasise competence perceptions, whereas those for self-esteem tend to concentrate on affective responses.

Self-efficacy has been more clearly operationally defined than self-esteem and self-concept. Operationally, self-efficacy has a number of unique properties: (i) self-efficacy involves judgments of capabilities to perform activities; (ii) self-efficacy beliefs are multifaceted, or multidimensional, rather than unidimensional, and are linked to different domains of functioning (the dimensionality of self-perceptions is discussed in the next section); and (iii) self-efficacy perceptions are context-dependent (this is because they are subject to non-ability influences). Bandura (2001) argues that the construction of sound self-efficacy scales must rely on an informative conceptual analysis of the factors which govern particular domains of functioning. That is, subscales must be tailored to activity domains and items must assess the multifaceted ways in which self-efficacy beliefs operate within these domains. He outlines his recommendations for constructing self-efficacy scales in his *Guide for Constructing Self-Efficacy Scales* (Bandura, 2001, 2006). He argues that accurate prediction of outcomes from self-efficacy beliefs can only be obtained by assessing self-efficacy at the optimal level of specificity that corresponds to the domain of functioning being analysed. In other words, self-efficacy judgements should be consistent with, and tailored to, the performance/behaviour domains with which they are compared (the specificity of self-perceptions is discussed in the next section).

Most researchers remain faithful to Bandura's original definition of self-efficacy, and operationalise this percept in a way that is consistent with his theoretical recommendations. Problems arise, however, when the specificity of self-efficacy beliefs does not correspond to the criterion behaviour/performance, or when self-efficacy is inappropriately defined or confused with other self constructs. Problems may also arise because self-efficacy items are sometimes confused with those used to measure self-concept. The typical self-concept item, for example, 'I am good at writing an essay', differs from a typical self-efficacy item which would be phrased something like 'How confident are you that you can successfully write an essay?' Confusion between the operational definitions of the items can make it difficult to compare findings.

1.1.3 Structure, dimensionality and specificity of self-perceptions

Structure and dimensionality

Self-esteem is typically seen as being a unidimensional construct, such that it consists of an overall, or global, perception of the self. Unidimensional models define self-esteem as a composite score derived from multiple items, each of which taps into overall, global, feelings about the self (Byrne, 1996). Early self-concept models were also grounded in the notion that self-concept is unidimensional, with measures devised such that item scores in different areas were summed to yield an overall score. Such models were analogous to the unidimensional construct of self-esteem. Recent models of self-concept typically propose the notion of a more differentiated, multidimensional self, with domain-related (domain-specific) self-concepts that are functionally distinct (Bong & Clark, 1999). These can inter-correlate but can also be interpreted as separate constructs. Such models view self-esteem as being a component of the multidimensional structure. However, different models differ in the way that self-esteem is incorporated into that structure.

The *correlated-factor model* (Byrne, 1996) proposes that self-concept is composed of multiple domain-specific self-concept facets that correlate amongst themselves as well as correlating with a separate *global* dimension of self-esteem (which Harter calls global self-worth). These facets can be interpreted as separate constructs and vary with age (Harter, 1983, 1990b; Marsh, 1989, 1990b). Measurement instruments developed within this model allow one to determine the extent to which domain-specific self-concepts affect global self-esteem. Self-concepts in various domains (academic, social, behavioural, for example) may or may not be mutually exclusive and can be conceptualised from the very specific to the very global (the specificity of self-perceptions will be discussed later). Individual domain-specific self-concept judgements can occur without reference to global self-esteem judgements (Harter, 1990c). The *Self-Perception Profile for Children* (SPPC; Harter, 1985b) and the *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988) are two of the most notable and widely used examples of assessment instruments developed within the framework of this model. Harter and colleagues also developed instruments within the correlated-factor model for other age-groups (e.g. Harter & Pike, 1983; Messer & Harter, 1986; Neemann & Harter, 1986; Renick & Harter, 1988). Harter's research has revealed that not only does self-concept become increasingly differentiated with age as ability to judge self-worth increases, but correlations among domain-specific self-concepts decrease with age (Harter, 1990a). This latter finding has been supported by other researchers (e.g. Byrne & Shavelson, 1986; Marsh, Craven, & Debus, 1991).

The *hierarchical model* also proposes that the self-concept is comprised of multiple domain-specific self-concepts that correlate. However, underpinning this model is that global self-esteem is a higher-order factor that comprises self-concepts in various domains. Self-esteem judgements are therefore dependent on self-concept judgements in specific contexts. Shavelson et al. (1976) were the first to propose a theoretical definition and model of self-concept that portrayed both a multidimensional and hierarchical structure (commonly cited as the Shavelson model). Categories within the hierarchy are differentiated by subject/area domain and organised with global perceptions of the self at the apex. At the next level of the hierarchy are academic and non-academic perceptions, and at the next are domain-specific self-perceptions. These are further separated into more subject-specific/area-specific self-concepts, each of which is tapped by individual items which reflect self-perceptions in that subject/area. As one goes further down the hierarchy, therefore, self-concept becomes progressively more specific. Perceptions within each domain, or dimension, are expected to inter-correlate but can also operate as separately interpretable entities. The Shavelson model of self-concept served as a basis for the development of the *Self Description Questionnaire* (SDQ) instruments devised by Marsh and colleagues, which have been produced for preadolescents, adolescents/late-adolescents, and young adults (Marsh, 1992a, 1992b, 1992c). The resulting self-concept model has become known as the Marsh/Shavelson model. Consistent with Harter (1990a), Marsh and Shavelson's research indicates that self-concept becomes increasingly differentiated with age. Harter's SPPC/SPPA measures and the SDQ measures reflect this age-related differentiation. Therefore, the number of subscales they incorporate increases for older age-groups (although there are subscales common to all age-related versions).

The hierarchical nature of self-concept has been disputed, however. Harter (1990a) questions whether it "does, in fact, mirror the psychological structure as it is phenomenologically experienced by individuals" (p. 579). Harter (1983, 1985a, 1986, 1990b) also argues that hierarchical models cannot be generalised to everyone because individuals differ in the extent to which a particular structure of self-concept is best for them. This is because success in some domains may be more important than in others. She argues that information reflecting the perceived importance of domains should be collected along with self-concept perceptions. Hattie (1992) suggests that while a multidimensional structure may be optimal for some people (or groups of people) a unidimensional structure might be a better representation for other individuals or groups. Furthermore, he contends that self-concept is more unitary before adolescence, and therefore might not lend itself to a multidimensional, hierarchical structure. Evidence supports a number of different levels to self-concept. However, this dispute remains unresolved as most research into self-concept hierarchy has used variations of the SDQ (e.g. Lau, Yeung, Jin, & Low, 1999; Marsh, Byrne, & Shavelson, 1988; Marsh & Shavelson, 1985; Marsh & Yeung, 1998; Yeung et al., 2000) or models related to it (e.g. Byrne & Shavelson, 1986; Byrne & Worth Gavin, 1996; Vispoel, 1995).

In relation to self-esteem and self-concept, therefore, theoretical models of self-esteem are typically unidimensional, whereas theoretical models of self-concept are typically multidimensional. This has contributed to the debate about what actually constitutes self-esteem and self-concept. In current literature, measures that assess the constructs unidimensionally are usually viewed as measuring self-esteem, whereas multidimensional measures are seen as measuring self-concept.

Like self-concept, self-efficacy is proposed as a multidimensional construct with differentiation between domains of functioning. Research provides support for self-efficacy conceptualised as a multidimensional construct (e.g. Bong, 1997; Bong &

Hocevar, 2002). This varies depending on gender, age and prior knowledge (Bong, 1999, 2001; Bong & Skaalvik, 2003). It has also been suggested that self-efficacy has a 'loosely hierarchical' structure (Bong & Skaalvik, 2003), although this has yet to be confirmed. Preliminary evidence indicates that social, task management and academic higher-order factors underlie domain-specific self-efficacy percepts (Choi, Fuqua, & Griffin, 2001; Miller, Coombs, & Fuqua, 1999), although Miller and colleagues observed that these factors could be interpreted in a number of ways (for example, with task management factors being interpreted in either social or academic situations), and questioned whether they were theoretically meaningful. Studies also suggest that verbal and quantitative higher-order factors underlie problem-specific and subject-specific academic self-efficacy percepts (Bong, 1997, 1999, 2001). The study of self-efficacy hierarchy is very much in its infancy, however, and it has yet to be confirmed whether the internal structure of self-efficacy percepts resembles the hierarchical nature of self-concept. As Bong and Skaalvik (2003) have noted:

> It needs to be demonstrated, as self-concept researchers have (Lau et al., 1999; Yeung et al., 2000), that the common factor underlying more specific self-efficacy beliefs is equivalent in content to the self-efficacy beliefs that are directly assessed at the more general level. (p. 23)

It is entirely possible that part of an individual's representation of their self-efficacy exists at a higher-order level. There is likely to be some covariation in ability to perform different tasks within a specific domain – being good at simultaneous equations may well be correlated with being good at applying Pythagoras' theorem – because these tasks share the need for some common sub-skills. A student may therefore observe that they are competent at a range of tasks within a domain, and so develop a higher-order self-perception that they are capable in mathematics. Even if this were not the case, an individual's expectations about how they will perform in new situations tends to be based on experiences in similar types of situations, and this mechanism might in itself lead to the development of higher-order beliefs about their self-efficacy.

Specificity

One issue relating to the dimensionality and hierarchy of self-perceptions is the degree of specificity (also commonly referred to as generality) at which they are measured. Self-esteem has typically been measured at a global level of specificity, consistent with it being defined as a unidimensional construct. In contrast, the focus on self-concept and self-efficacy as multidimensional and hierarchical constructs has led to a focus on their measurement at different levels of specificity. The specificity of self-concept/self-efficacy assessment is therefore relative to the level of the hierarchy which is being considered, such that general, or global, perceptions would be at the apex, domain-specific (also commonly referred to as domain-general) facets on the next level, subject/area-specific facets on the next level, and so on. The most specific measurement levels – task/skill-specific and problem/item-specific – would be at the bottom.

Measurement instruments that concentrate on specific facets of a task/skill, or problem/item, typically involve presenting descriptions of specific skill or task components, or sets of specific problems or items, performance on which is the target of prediction. For example, problem-referenced self-efficacy measures might assess students' self-efficacy for undertaking specific mathematics problems, verbal problems, or sentence combining (e.g. Schunk & Hanson, 1985, 1989; Zimmerman & Kitsantas, 1999; Zimmerman & Martinez-Ponz, 1990). Task/skill-referenced self-efficacy measures, on the other hand, would reflect more major aspects of successful performance, for example, confidence to write a one-page book summary, to read a text book or understand the main idea of a story, or to use computer related skills (e.g. Pajares, Miller, & Johnson, 1999; Schunk & Ertmer, 1999; Shell, Colvin, & Bruning, 1995). Domain- or subject-specific measures assess self-perceptions on a more general level. For example, domain-specific self-efficacy measures might ask students to report their confidence to succeed across a range of academic subjects, whilst subject-specific self-efficacy measures might ask for assessments of confidence to learn specific components relative to one subject.

Self-efficacy was originally presented by Bandura (1977) as a task/skill-specific or problem/item-specific construct, although he has also suggested that it can be operationalised on a domain-specific or subject/area-specific level. Self-efficacy theory would expect there to be some covariation across distinct domains of functioning when activities in different domains are governed by similar sub-skills. Domain- or subject/area-specific self-efficacy is conceptualised such that an individual's expectancies in new situations are based on experiences in the most similar past situation (Bandura, 1977, 1986, 1997). Domain-specific and subject/area-specific assessments are commonly used in academic self-efficacy research. This is partly because criterion tasks such as term grades and attainment test results do not lend themselves to very specific self-efficacy assessment. Most self-efficacy research concentrates on the more specific aspects of the construct, however.

Self-concept, by contrast, tends to be measured at relatively general levels of specificity. Typically, the most specific measurement units ask for judgements in particular subject areas (Bong & Clark, 1999; Bong & Skaalvik, 2003). Self-concept research rarely looks at students' academic performance on specific tasks or problems, but is more likely to look for relations between subject grades and self-concept judgements in particular subjects.

Self-efficacy and self-concept items should closely correspond to the predicted outcomes (i.e. the performance/behaviour) in order to achieve the maximum predictive accuracy (Bong & Clark, 1999; Multon, Brown, & Lent, 1991; Pajares, 1996; Pajares & Schunk, 2001). Bandura (1997) argues that the predictive value of self-efficacy perceptions is reduced, or even nullified, when instruments do not correspond to the achievement outcome with which they are compared. He also suggests that maximum predictive utility is achieved using more specific self-efficacy measures and more specific achievement indices. Following Bandura, when using self-efficacy to predict achievement, the most accurate predictions of performance are obtained when theoretical procedures and guidelines concerning correspondence and specificity are closely adhered to.

Forming self-perceptions at a general level of specificity can be problematic. This is because when individuals are asked to make domain-specific or subject/area-specific assessments in a given context they are expected to do so without reference to explicit performance criteria; judgements must be generated without a respondent having a clear task or activity in mind. Consequently, individuals have to make an aggregated judgement using competence information that is the most relevant to them within the wider domain, and which is most salient and readily accessible in the self-schema (Bandura, 1997; Bong & Skaalvik, 2003). This means that by default, respondents are essentially choosing their own performance criteria against which to make self-perception appraisals. General measures can, therefore, suffer from questionable relevance to the domain of functioning being explored and result in a confounding mixture of items that reflect generalised personality traits, and the emotional and motivational effects of self-beliefs and past behaviours, rather than context-specific judgements (Bandura, 1997). Bandura has cautioned that self-efficacy should, in the main, be assessed using context-specific measures consistent with the achievement index with which they are being compared, rather than with more general measures. However, in instances where situational variants cannot always be specified in advance, or where considering self-efficacy (and self-concept) judgements for all variants within a general context is too time-consuming, assessing self-perceptions at domain- or subject/area-specific levels can expand the scope of predictiveness, compared to measures that selectively explore specific tasks. For example, there may be more value in asking the general questions such as 'How well can you learn mathematics?' rather than specific questions about multi-digit addition, calculating angles, solving simultaneous equations, and so on.

1.1.4 Treatment of self-esteem, self-concept and self-efficacy in the literature

Self-esteem, self-concept and self-efficacy are almost entirely examined in the literature as separate variables. However, there are strong theoretical and conceptual similarities between the variables and, as will be discussed later in this chapter, they have also been shown to be empirically related. Given this, it has sometimes been argued that they should also be viewed as integrated constructs. For example, there is the school of thought that sees self-concept and self-efficacy as overlapping entities and questions whether they are conceptually distinct (e.g. Pietsch, Walker, & Chapman, 2003). This will be discussed in detail in Chapter 2. There are also arguments that self-perceptions are not distinct from other self-related constructs. For example, Judge and colleagues (e.g. Bono & Judge, 2003; Judge, 2009; Judge, Erez, Bono, & Thoreson, 2003) suggest that self-esteem and self-efficacy, together with locus of control (Rotter, 1966) and neuroticism (emotional stability; Eysenck, 1991), form a broad integrated trait called *core self-evaluations*. They argue that this trait explains much of the overlap amongst these four constructs and have consistently shown that they load onto a common factor (e.g. Judge et al., 2002; Judge, Locke, Durham, & Kluger, 1998). Core self-evaluations therefore not only appraise one's self-worth but reflect competency to perform in multiple contexts, beliefs in one's capabilities to control one's life, and a general sense that life will turn out well. Although core self-evaluations will not be examined here, Judge et al.'s research illustrates that self-perceptions do not operate in isolation, but can overlap with other dimensions of the self.

1.2 Formation of Self-Perceptions

Self-esteem and self-concept tend to be dependent on the same sources of information, although some have more relevance than others, depending on the nature of the underlying construct. Self-efficacy is typically formed from different sources than self-esteem or self-concept. The specific determinants of each self-perception construct are discussed below.

1.2.1 Determinants of self-esteem and self-concept

A number of key antecedents of self-esteem and self-concept have been identified. These include *frames of reference*, *causal attributions*, *reflected appraisals from significant others*, *psychological centrality* and *mastery experiences* (Bong & Skaalvik, 2003; Rayner & Deci, 2001; Skaalvik, 1997a).

Frames of reference are the standards against which an individual judges their own traits and accomplishments. These standards can be based on internal (self) and external (social) comparisons that are dependent on social and cultural values. Social comparisons are particularly important. By comparing their accomplishments with those of others, as well as with their own in related areas, a person develops a sense of worth. Frame of reference effects are seen as the primary determinant of self-concept of ability (Marsh, 1986; Marsh, Walker, & Debus, 1991), with evaluative components of the self-concept being based on both absolute (an ideal) and relative (relevant others) frames of reference. Marsh and colleagues (Marsh, 1987; Marsh & Hau, 2003) refer to the 'big-fish-little-pond' effect which encapsulates social comparisons within a frame of reference model in academic contexts. They suggest that students compare their own academic performance with that of their classmates and use the resulting social comparison information to form their own self-concept; equally able students will have reduced academic self-concept when attending high-ability schools, but higher academic self-concept when attending low-ability schools. This links to James' (1890/1963) early conception of self-concept; he too recognised that objective characteristics and accomplishments can be evaluated in relation to different standards of comparison, thereby leading to disparate self-concepts.

Attribution theory – the study of perceived causation – refers to the ways people attribute causes to their behaviour (Weiner, 1974, 1980, 1986). *Causal attributions* therefore determine reactions to success and failure. There are three dimensions of perceived causality: stability (whether the perceived cause is stable or unstable), locus (whether the cause is internal or external to the self), and controllability (whether the cause is something that a person can control or not). These interact in eight ways different ways. Causal factors can be either environmental or personal. The crucial feature in relationship to self-perceptions is what internal attributions people make. For example, when an individual attributes success to internal, stable, uncontrollable factors (ability, for example) and failure to external, unstable, uncontrollable factors (such as bad luck or task difficulty) their self-perceptions are likely to be strengthened. This is because seeing success as due to personal capabilities (such as having high ability) is likely to make an individual feel good about themself and give them a stronger belief in their competence. Conversely, seeing failure as due to having low ability is likely to result in lowered self-perception. If failure is seen as being due to lack of effort instead of ability (internal, unstable, and controllable) a student can protect their self-perceptions; this is because they can see a way to avoid failure in the future (by exerting more effort). Seeing failure as being due to bad luck or task difficulty can strengthen self-perceptions because the cause of the failure may not be present if the same circumstances occur in the future. Causal attributions are suggested to influence both cognitive and affective aspects of self-esteem and self-concept. Attributions and self-esteem/self-concept have a reciprocal relationship, such that self-esteem/self-concept perceptions affect later attributions, and attributions affect self-esteem and self-concept (Stipek, 1993; Tennen & Herzberger, 1987). Research suggests that individuals protect and increase their self-esteem/self-concept by taking credit for their successes, but not for their failures (e.g. Skaalvik, 1994; Whitley & Frieze, 1985). This is referred to as a 'self-serving attribution'.

Reflected appraisals have been given more attention as a determinant of self-esteem than of self-concept (Skaalvik, 1997a). The influence of reflective appraisals was originally seen in Cooley's (1902) notion of the *looking-glass self* – that to a great degree we are affected by others' reactions to us. Cooley suggested that our self-perceptions are based on the judgements we imagine *others* make of us. In turn, these judgements depend upon the qualities we see in other people – if they have qualities we aspire to, such as virtuosity or success, we think they will judge us more harshly than will people who lack these attributes. Self-esteem is not then shaped by our objective judgements of our own accomplishments but is shaped by how we think other people will see us. Much of the research into and theorising about self-esteem (and self-concept) is based on Cooley's notion. Feedback from others, whether positive or negative, implicit or explicit, will be absorbed into our self-appraisals in a way that is either beneficial or detrimental to the self-schema (Campbell & Lavellee, 1993; Harter, 1993; Trent, Cooney, Russell, & Warton, 1996).

Psychological centrality refers to the idea that it is competence in areas deemed important to the individual, rather than their general or overall competence, that determines whether success or failure has meaning for a person's overall self-esteem (Bong & Skaalvik, 2003).

James (1890/1963) was the first to offer this idea in his early theorising about the self. Evidence both supports and contradicts the psychological centrality hypothesis; therefore it is difficult to make definitive conclusions about the nature of its impact on the self (Harter & Mayberry, 1984; Marsh, 1986; Skaalvik, 1997a). Common sense suggests that where students perceive specific subjects as most important for their future success, perceptions of competence in those subjects might have the most impact on overall self-esteem perceptions. Research indicates, however, that psychological centrality only holds where individuals are relatively sure of their positive self-perceptions or for individuals with relatively negative self-perceptions (Pelham & Swann, 1989).

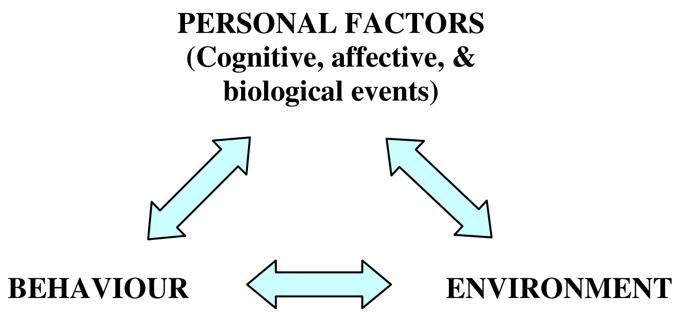
Self-perceptions are also created from past experiences of performance/behaviour in a similar domain or situation, i.e. by *mastery experiences*. Mastery experiences are particularly important for the formation of self-efficacy (discussed in the next section). They are not explicitly emphasised in the formation of self-concept (and not at all in the formation of self-esteem), but Skaalvik (1997a) argues that they *are* important, stating: "to do better than others and to attribute success internally one has to have some degree of mastery" (p. 71). He suggests that mastery experiences may affect self-concept and self-esteem perceptions through social comparisons and internal attributions, although empirical research examining this is lacking.

The determinants of self-esteem and self-concept formation, especially self-esteem, are generally age-related (Marsh, 1989; Orth, Trzesniewski, & Robins, 2010; Robins & Trzesniewski, 2005; Twenge & Campbell, 2001). Typically, their development in young children is heavily influenced by parental attitudes and behaviours towards the child. The early period of a child's life is particularly important for developing positive self-esteem and self-concept perceptions. As children get older their experiences outside the home, in school, and with peers become increasingly important. Between five and 11 years old they develop a sense of self through watching, listening, and copying others at home and at school, and they evaluate their accomplishments and interactions with others in terms of their own worthiness and experience. Children develop an increasing awareness of the things that they are good and not so good at. Self-esteem/self-concept begins to affect behaviour as the child attempts to maintain and protect their sense of self-worth against the challenges, problems and experiences of life. Between the ages of 11 and 17 the ability to cope with basic challenges and developing a sense that they are worthy of happiness is key to a young person's self-esteem and self-concept development.

1.2.2 Determinants of self-efficacy

Self-efficacy is grounded in Bandura's *Social Cognitive Theory* (1986). Central to social cognitive theory is the idea that behavioural and environmental factors create (or determine) self-efficacy perceptions. These in turn inform and affect subsequent behaviour/performance and subsequent reactions to other environments. This forms the basis for Bandura’s conception of *triadic reciprocal causation* (Figure 1.1), which means that events in a person’s life are functionally dependent on other events. Internal personal factors (cognitive, affective and biological events), behaviour, and environmental factors influence one another bidirectionally to result in a triadic reciprocality of human functioning.

Figure 1.1 Pictorial representation of Bandura’s theory of *triadic reciprocal causation.* Adapted from Bandura, 1997, p. 6.



The formation of self-efficacy beliefs is dependent on information derived from four main factors, or sources: *enactive mastery experience*, *vicarious experience*, *social persuasions*, and *physiological states* (Bandura, 1986, 1997). The relative influence of each source, or set of sources, is likely to vary for different activities and under different circumstances. It is important to note, however, that the sources of information from which self-efficacy perceptions are derived are not translated directly into self-efficacy judgements (Pajares, 1997). Events have to go through a process of interpretation before they provide the information on which self-efficacy judgements are based. These interpretations are subject to rules for weighting, integration, and recollection of events. The determinants of self-efficacy formation are not generally tied to stages of development, although the younger period of a child’s life is particularly important for building healthy self-efficacy beliefs.

Enactive mastery experience – prior experience and interpretation of the task in question – is the most influential source of self-efficacy perceptions (Bandura, 1977, 1997; Pajares, 1997). Individuals gauge the effects of their prior experiences, and their interpretations of these effects help to create their self-efficacy beliefs. Success raises and strengthens self-efficacy, whereas failure lowers it. It is believed that self-efficacy built on past successes can withstand temporary failure (Bong & Skaalvik, 2003). The effects of failure depend on existing self-efficacy perceptions and the timing of failures, with later failures not having as negative an impact as earlier ones. As Bandura states: "after strong expectations are developed through repeated success, the negative impact of occasional failure is likely to be reduced" (1977, p. 195). Bandura (1997) also points to the importance of causal attributions in relation to mastery experiences. However, he suggests that rather than attributions shaping self-efficacy perceptions (as in the case of self-esteem and self-concept), attributional factors "serve as conveyors of self-efficacy information" (p. 84): self-efficacy perceptions typically determine how people ascribe their attributions of success or failure. In turn, these attributions affect subsequent motivation and behaviour.

As with the formation of self-esteem/self-concept perceptions, initial sources of self-efficacy are centred within the family. In infancy, influences provided by parents and caregivers, that help infants to interact and experience success in controlling environmental events, allow children to become more attentive to their own behaviour and become more efficacious in learning new responses. Children whose parents arrange for them to have more varied mastery experiences will tend to have higher self-efficacy.

When individuals have limited prior experience or are uncertain about their own abilities they become sensitive to the actions of others. Self-efficacy perceptions are therefore also formed from *vicarious experiences* that are mediated through modelled attainments (Bandura, 1997). Parents who model persistence and effort, and teach their child ways of coping with difficulties, can help to strengthen their child's perceived self-efficacy. Social comparisons and peer group modelling are also powerful sources of vicarious influence for developing self-efficacy (although social comparisons are not as relevant as they are for self-esteem/self-concept formation). Steering a child toward efficacious peers can provide further vicarious influences. Schunk (1981, 1983a, 1987) has demonstrated the importance of vicarious experiences in the development of self-efficacy beliefs.

Self-efficacy beliefs also develop as a result of *social persuasions* – implicit and explicit messages and verbal judgements received from others. Home and school are primary sources of persuasive information; parents and teachers who encourage and support youngsters in their efforts help develop children who feel more competent. Negative persuasive messages are especially influential in developing low self-efficacy, especially if a child lacks the resilience and wherewithal to withstand or counteract such judgements (Bandura, 1986). The impact of negative persuasive messages may be partly a consequence of frames of reference and reflected appraisal effects, although because self-efficacy judgements typically focus on ability to accomplish specific tasks, frames of reference and reflected appraisals are not seen as particularly relevant in their formation (Bandura, 1997).

Finally, self-efficacy perceptions are derived from *physiological states* such as anxiety, stress, arousal, fatigue, and mood. Individuals gauge their confidence to perform a task by the emotional state they experience as they perform or contemplate an action, for example, the butterflies in the stomach phenomenon. In cases when emotional arousal for performing a task is particularly strong it can weaken performance. In turn, perceptions of self-efficacy influence physiological states themselves, creating a cyclical effect.

1.2.3 Implications for intervening to enhance self-perceptions

Self-esteem and self-concept constructs are characterised by considerable stability across time, and across situations (Marsh & Yeung, 1998; Shavelson & Bolus, 1982). This is because they are derived from environmental experiences and reinforcements, and influences from significant others, from a very young age. As such, they are more likely to be set within the self-schema (Skaalvik, 1997a). They are therefore highly resistant to manipulation (Craven, Marsh, & Debus, 1991), although the idea of situational variability has been recognised, especially in relation to self-concept (Rosenberg, 1965). There are developmental differences in the stability of self-esteem and self-concept; younger children's self-percepts are less stable and more flexible, older children's are more firmly established and are particularly resistant to change (Skaalvik & Hagtvet, 1990; Wigfield et al., 1997).

It has been suggested that self-efficacy is more subject to change than self-esteem or self-concept (Pajares & Graham, 1999). It tends to demonstrate lower situational and temporal stability and is therefore more susceptible to intervention (Pajares & Graham, 1999), although it is interesting to note that the stability of self-efficacy beliefs has rarely been investigated (Bong & Skaalvik, 2003). Self-efficacy is a less stable construct because of how it is formed in childhood – mainly through mastery experiences of the task at hand. Because mastery experiences are closely tied to a specific context, they are less likely to be affected by social and environmental influences. Self-efficacy beliefs are especially sensitive to contextual variation in a particular task or activity and are more resilient to temporary failure (Bandura, 1997). People can gauge their own self-efficacy even about quite specific behaviours (Pajares & Schunk, 2001). Studies suggest that it is usually easier to weaken self-efficacy beliefs through negative appraisals than to strengthen self-efficacy beliefs through positive encouragement (Bandura, 1986).

Self-efficacy is, therefore, seen as a dynamic construct which can shift depending on what one is asked to do. In contrast, self-esteem and self-concept are viewed as being fairly stable over the long-term. However, they can be temporarily affected as a function of changing roles, expectations, performances, responses from others and by other situational characteristics, for example, during times of challenge or threat. Therefore, self-esteem/self-concept can rise and fall; in certain situations, or on certain days an individual may feel better or worse about themselves than would typically be the case. Thus, self-esteem and self-concept are reactive and fluctuate, rather like an emotion would (Skaalvik, 1997a). This raises questions about *how* reactive self-esteem/self-concept is and whether people differ in their reactivity (Can self-esteem/self-concept be quickly lowered or raised? Are changes permanent? Do some individuals rapidly adjust? Are others slow to react?). These are important questions that are relevant to developing interventions aimed at enhancing self-esteem and self-concept perceptions. These questions also apply to efforts to enhance self-efficacy.

Whether self-perceptions can be raised at all has important implications for the types of interventions implemented in schools. The fact that self-efficacy is developed mainly through mastery experiences would suggest that the types of self-orientated interventions that are often implemented in schools, and that focus on raising students' competence (as well as feelings of self-worth) through verbal persuasion methods, would not be effective. Bandura (1997) argues that because such types of interventions focus on developing feelings about the self, rather than cognitions, they are less likely to enhance self-efficacy. Furthermore, if self-efficacy is based on context-specific judgements, it is debateable whether an intervention aimed at manipulating global, 'whole-person' judgements will have their intended effects on self-efficacy. Interventions aimed at enhancing self-efficacy might therefore be better placed by focusing on raising competence and confidence through experiences of the task at hand, rather than using persuasive influences. The implication is that self-orientated interventions might be more useful for facilitating change in self-esteem and self-concept, given that they are typically based on changing affective responses to the self (increasing optimistic thinking through the use of positive self-talk, for example). However, given that self-esteem and self-concept are suggested to be highly resistant to change, even if short-term change occurs, it is arguable whether such interventions can make a lasting difference in students' view of themselves. Therefore, if it is not possible to facilitate long-term improvements in self-perceptions then there is little benefit in intervening in the first place.

There is, however, fairly extensive evidence that the self-esteem and self-concept perceptions of school children are susceptible to intervention and can be significantly improved (e.g. Byrne, 1984; Marsh & Richards, 1988; Scheirer & Kraut, 1979; see also meta-analyses by Haney & Durlak, 1998; Hattie, 1992; O'Mara, Marsh, Craven, & Debus, 2006). O'Mara et al. (2006) reported an average medium-sized effect of intervention on self-esteem/self-concept across a diverse range of treatment types, research designs, and measures. Improvements are more likely where interventions are focused specifically on the constructs, rather than hoping self-esteem/self-concept can be modified indirectly by working on other areas (Haney & Durlak, 1998; O'Mara et al., 2006). Other research has reported no significant difference between studies that directly target self-concept, indirectly target self-concept, or are a combination of both, however (Hattie, 1992). Direct interventions involving focused praise for good performance have typically been found to be more effective than other kinds of direct intervention (O'Mara et al. 2006), and the most effective programmes are those guided by a theoretical or empirical rationale, or both (Haney & Durlak, 1998). There is also evidence of positive effects of training in self-praise and positive self-talk, both for children and adolescents (e.g. Barrett, Webster, & Wallis, 1999; Craven et al., 1991). Interventions that target populations with specific clinical needs, those with developmental delay, or those that might for other reasons be hypothesised to have low self-perceptions, also tend to show substantially larger effects than interventions targeted at a general child or adolescent population (Haney & Durlak, 1998; Hattie, 1992; O'Mara et al., 2006).

Self-efficacy intervention studies in educational settings are less prevalent that self-esteem or self-concept intervention studies, possibly because of education's reduced emphasis on improving self-efficacy compared to improving self-esteem. Despite this, there is evidence to suggest that self-efficacy perceptions are susceptible to manipulation and also that it is possible to intervene to influence the self-efficacy of school children (e.g. Schunk, 1983b, 1983c). Such interventions typically focused on changing specific aspects of self-efficacy rather than using the type of globally aimed persuasive influences that are common in many self-esteem/self-concept interventions.

It has been noted that self-concept becomes less stable at lower levels of the hierarchy, and that self-concepts at the apex of the hierarchy are more resistant to change (Shavelson et al., 1976). This suggests that domain-specific self-concept is more susceptible to change than self-esteem (given that self-esteem is proposed as being the global component of the self-concept). However, O'Mara et al. (2006) found no statistically significant differences in effect sizes between self-esteem interventions or domain-specific self-concept interventions, which indicates that global self-esteem and domain-specific self-concept are as equally subject to intervention. They did find that interventions targeting a specific facet of self-concept, and also measuring that facet, yielded the highest effect sizes. Interventions that did not adequately match the intervention to the domain being measured had lower effect sizes. These findings provide some context for thinking about the lower stability of self-efficacy (and hence higher susceptibility to manipulation) in relation to self-concept and self-esteem. Self-efficacy is frequently examined at more specific levels than self-concept. This may be why it has been suggested to be a more malleable construct. Self-efficacy examined at more global levels of specificity might not be so susceptible to intervention. Note that O'Mara et al. (2006) included three self-efficacy studies in their sample and did not differentiate them from self-concept studies. This may have skewed the findings slightly given that self-efficacy and self-concept are proposed as conceptually different constructs.

Evidence suggests therefore that self-efficacy, self-esteem and self-concept can be positively influenced via intervention. Research has rarely explored whether the effects of intervention are sustained over time, however. The findings from Hattie's (1992) meta-analysis indicated that intervention effects decrease over time (from examination of 36 interventions that included follow-up outcomes). In contrast, from the few of O'Mara et al.'s (2006) studies that included follow-up outcomes (20 out of a total sample of 200 interventions) there was evidence that for some, intervention benefits persist. O'Mara and colleagues found a moderately positive correlation between effect size and post-test/follow-up time lapse and suggested that this might represent a sleeper effect in which the effects of the intervention increase over time.

Relevant to educational research is whether interventions designed to positively enhance self-perceptions also have a positive effect on academic functioning. The relevance of self-perceptions as causal factors in academic functioning is discussed in the next section. In relation to intervention research, it is unclear whether interventions that target self-perceptions also have a positive impact on academic performance (the self-concept meta-analyses discussed above are limited in clarifying causal connections, although they do indicate some effects on academic performance). Despite evidence indicating a causal relationship between self-perception and academic performance, this does not necessarily mean intervention-induced increases in self-perception will result in increased attainment. Laboratory studies in which self-efficacy is manipulated, and that use appropriate controls, do tend to show performance effects (Boyer et al., 2000). However, studies in real-world educational contexts that include pre- and post-performance measures are relatively rare and evidence is equivocal. An early review (Scheirer & Kraut, 1979) failed to find evidence of performance benefits for self-concept training, and there is more recent evidence that in some contexts increasing self-perceptions can result in a decline in performance (Forsyth, Lawrence, Burnette, & Baumeister, 2007; Vancouver, Thompson, & Williams, 2001), although this has been disputed (Bandura & Locke, 2003). Studies suggest that there is a causal relationship between self-perceptions and aspirations. This indicates that intervening to improve self-perceptions would be a positive move if we want to enhance students' aspirations for future educational and occupational pursuits. Studies manipulating self-perceptions and examining the effects on aspirations are limited. However, following a comprehensive longitudinal study of the development of adolescents' occupational aspirations, Rojewski and Yang (1997) reported that occupational aspirations are relatively established by the eighth grade and remained quite stable from early to late adolescence. They suggested, therefore, that if we want to enhance students' aspirations, interventions aimed at doing so should begin in elementary school and be sustained throughout secondary education.

1.3 Self-Perceptions as Causal Agents in Academic Functioning

A central question in any theory of cognitive regulation of behaviour concerns the issue of causality: do self-perceptions operate as causal factors in human functioning? Causality, and the direction of causality, is one of the most difficult problems to confront the study of self-perceptions. Within education, the most critical question is whether high self-perceptions lead to better academic performance, whether academic competence promotes the development of high self-perceptions, or whether both occur at the same time. For example, in self-esteem research the issue is whether feeling good about oneself is responsible for increased achievement, or whether successful performance is responsible for stronger feelings of self-worth. In self-efficacy research the issue is whether a strong feeling that one can complete a given task is primarily responsible for increased achievement, or whether successful performance is largely responsible for highly efficacious feelings. This question of causality, which has yet to be resolved, lies at the heart of the self-perception–academic performance debate and interventions that are aimed at improving self-perceptions. If correlations between self-perceptions and academic performance simply mean that self-perceptions are outcomes of successful academic achievements, rather than a cause, then there is little to be gained by intervening to foster such perceptions.

In examining the role of self-perceptions in relation to academic functioning a number of factors need to taken into account: theory of self-perception causality; the mechanisms by which self-perceptions affect academic functioning; and which self-perception has the most causal influence over academic functioning. These will be discussed in turn below.

1.3.1 Theory of self-perception causality

An excellent summary of the theoretical models of self-perception causality is given in a recent paper by Green, Nelson, Martin, and Marsh (2006). Green et al. outline three distinct competing models for the causal ordering of self-perceptions: the *self-enhancement model*, the *skill development model*, and the *reciprocal effects model*. The authors discuss these models as relating to self-concept theory and academic performance, but the principles for understanding the causal relationships between other self-perceptions and other aspects of academic functioning are the same. The *self-enhancement model* maintains that self-perceptions are primary determinants of academic performance, i.e. we do well because we feel good/confident about ourselves and what we can do (Pajares & Schunk, 2001). Proponents of this model argue that interventions and school reform aimed at enhancing self-perceptions will ultimately improve academic performance (Dubois, 2001; Kahne, 1996). The *skill development model* maintains that prior performance (successful or unsuccessful) influences self-perceptions (and subsequent performance), but that self-perceptions do not influence performance. Therefore self-perceptions are not a determinant but a *consequence* of good academic performance, i.e. we feel confident and good about ourselves because we do well (Pajares & Schunk, 2001). Proponents of this model argue that the best way to enhance self-perception is to promote academic skill development and school reform that supports increasing standards and responsibility for student learning (Marsh, Hau, & Kong, 2002; Marsh, Trautwein, Ludtke, Koller, & Baumert, 2005). The third model, the *reciprocal effects model*, holds that self-perceptions and academic performance are reciprocally related and mutually reinforcing, i.e. prior self-perceptions affect subsequent performance and also prior performance affects subsequent self-perceptions (Bandura, 1997; Guay, Marsh, & Boivin, 2003). It has been suggested that the reciprocal effects model has major implications for interventions designed to facilitate educational outcomes (Green et al., 2006; Marsh et al., 2002). These authors argue that gains in self-perceptions are likely to be short-lived if self-perceptions are enhanced without paying attention to improving academic performance, and vice-versa. Self-perceptions and performance would therefore both be likely to suffer in the long term.

The cause/effect issue has been particularly contentious in self-esteem research. It is plausible that self-esteem may have a causal influence over academic performance (and other academic outcomes) as students with high self-esteem may strive to attain academically in order to maintain feelings of positive self-worth (Rosenberg, 1979). There appears to be no support for this, however. Conversely, academic performance has been found to act as a causal factor over self-esteem (e.g. Rosenberg, Schooler, & Schoenbach, 1989; Schmidt & Padilla, 2003; Skaalvik & Hagtvet, 1990), providing support for the skill development model. Others researchers claim there is no direct relationship between self-esteem and academic performance at all (Kobal & Musek, 2001; Robinson, Taylor, & Piolat, 1990), or argue instead that prior influences (family background, ability, early school performance, social class) are the underlying causal factors (Bachman & O'Malley, 1977; Maruyama, Rubin, & Kingsbury, 1981). In their reviews of self-esteem research, Emler (2001) and Baumeister et al. (2003) both concluded that the weak self-esteem–academic performance relationships that have been found reflect a small effect of performance on self-esteem (supporting the skill development model).

Considerable research suggests that students with a positive self-concept are more likely to engage in proactive academic behaviours because such behaviours help to confirm their perceptions, thus helping them to maintain consistency in how they view themselves (Brown, 1993; Marsh, 1990b; Swann, 1997). Consequently students are more likely to achieve academically (Rosenberg, 1979). This supports the self-enhancement model for the causal ordering of self-perceptions. However, questions of causality between self-concept and academic performance pose a great challenge and have yet to be resolved. Research variably supports the reciprocal effects model (e.g. Marsh, 1990b; Marsh & Craven, 2006; Wigfield & Karpathian, 1991), the self-enhancement model (e.g. Helmke & van Aken, 1995; Marsh, Byrne, & Yeung, 1999), and the skill development model (e.g. Newman, 1984). The controversy remains despite many recent studies having controlled for background factors in their analyses. Self-concept has been shown to have more of causal influence over academic performance with age. Early on in their schooling students do not yet have an established self-concept; therefore academic performance/attainment provides critical information for shaping self-concept percepts (skill development model). As students get older and self-perceptions become more firmly established, the self-concept–performance relationship becomes more reciprocal (Helmke, 1989; Skaalvik & Hagtvet, 1990). This change of direction of causality from skills-based to reciprocal indicates that the self-concept–academic performance relationship should be seen from a developmental perspective (Byrne & Shavelson, 1996; Guay et al., 2003). Research also indicates that the self-concept–performance relationship varies dependent on nationality (Kobal & Musek, 2001). These issues may account for the lack of consistency about the nature of the causal relationship between self-concept and academic performance.

For students to demonstrate more proactive behaviours as a resulting of having positive self-concept, self-concept needs to have some degree of causal influence over motivation. Research is this area is limited, however, and is equivocal about the nature of the self-concept–motivation relationship. Preliminary findings variably support all three models (e.g. self-enhancement: Mac Ivor, Stipek, & Daniels, 1991; skill development: Skaalvik & Valas, 1999a, 1999b; reciprocal: Marsh et al., 2005).

Bandura (1986) has always contended that self-efficacy and behaviour influence each other reciprocally; therefore the issue of causality in self-efficacy research has not been as contentious as that surrounding self-concept and self-esteem research. Research undertaken by Schunk and colleagues has demonstrated the causal role of self-efficacy on students' academic performance and related behaviours (providing support for the self-enhancement model of causality) (e.g. Schunk, 1982, 1983b, 1984a, 1984b; Schunk & Hanson, 1985; Schunk, Hanson, & Cox, 1987; Schunk & Swartz, 1993). Very little of this research has controlled for factors such as ability and prior performance, however. Note also, that despite self-efficacy being proposed as a reciprocal construct, much of the research examining the causal role of self-efficacy has been designed to examine its influence on academic outcomes (Skaalvik & Bong, 2003).

1.3.2 Mechanisms by which self-perceptions affect academic functioning

Motivation

If we are to assume that self-perceptions affect academic functioning then there are questions about the mechanisms by which these effects occur. Self-perceptions can have indirect effects on performance and behaviour through perseverance and motivation. Positive self-perceptions might help to make an individual more motivated, which in turn might help them to learn better and try harder on tests/exams. In turn they could achieve better academically and have higher aspirations. In this situation, more positive self-perceptions would not make a person any cleverer, cognitively (so that they learn better), but they would indirectly help them to perform better. Positive self-perceptions therefore determine the amount of effort and perseverance a person will expend in a given endeavour. For example, persons who have high levels of self-efficacy for a given performance domain will maintain performance when confronted with impediments and increase their efforts to achieve their goal (Bandura & Cervone, 1983). Success in attaining goals results in positive self-evaluations and satisfaction. On the other hand, individuals with low levels of self-efficacy are more likely to reduce or cease their efforts and engage in negative self-evaluations when faced with challenges. Self-efficacy perceptions further affect motivation by shaping the outcomes expected from one’s efforts; people who perceive themselves as highly efficacious will expect favourable outcomes, while those with less confidence in their performance capabilities will envision negative outcomes (Bandura, 1989). Self-efficacy judgements are specifically hypothesised to mediate the effects of other influences, and self-efficacy theory advocates explicitly that perceived self-efficacy determines motivation (Bandura, 1977). The validity of self-efficacy beliefs for predicting students’ motivation has therefore become a major empirical issue within educational research. There is evidence that highly self-efficacious students will willingly undertake difficult and challenging tasks, work harder, persist longer in the face of difficulties, and evidence higher academic aspirations (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Bandura & Schunk, 1981; Salomon, 1984; Schunk, 1981; Zimmerman & Kitsantas, 1999).

Self-esteem and self-concept percepts also have motivational properties; high self-concept has been associated with increased engagement and persistence in class, students' help-seeking behaviours and academic effort (e.g. Ames, 1983; Skaalvik & Rankin, 1995; Skinner, Wellborn, & Connell, 1990), although effects can be domain-specific (Harter, 1990a). High self-esteem individuals are more likely to be motivated to persist in the face of failure and be able to judge when continued persistence is not a good strategy (for example, in the face of repeated failure) (Di Paula & Campbell, 2002). This suggests that individuals with more positive self-perceptions have better functional responses to failure which may indirectly contribute to slight advantages in performance (Baumeister et al., 2003). Such research indicates the importance of self-perceptions for regulating motivation. Self-perception researchers consistently agree that low self-perceptions about one's academic capabilities can have serious consequences for one's motivation to achieve (Graham & Weiner, 1996; Skaalvik, 1997a; Zimmerman, 2000).

The self-perception–motivation link is therefore well recognised in motivation research. There are a number of different motivational constructs that can be viewed as enablers for academic success within the context discussed here: *achievement goal theory*, *attribution theory of motivation, expectancy-value theory*, and *intrinsic motivation*.

Achievement goal theory is one of the most prominent theories within motivational research and holds that there are two general goal orientations that motivate people to engage in a task. These goals are referred to under a variety of different labels: *mastery/performance* (Ames, 1992; Elliot, 1997), *learning/performance* (Dweck & Leggett, 1988), *task/ability* (Maehr & Midgley, 1996), and *task-involved/ego-involved* (Nicholls, 1984). The terms *mastery/performance* are used here. Mastery goals orient learners towards developing new skills, new levels of understanding, and achieving mastery which is based on self-referenced standards rather than on the standards of others. In contrast, performance goals orient learners to focus on their ability and self-worth, and comparing themselves with other people. There are two types of performance goals: performance-approach orientations (which reflect a focus on trying to outperform others/showing superior ability, and receiving recognition for such) and performance-avoidance orientations (which reflect a focus on avoiding looking incompetent or inferior in relation to others). The general theoretical viewpoint is that mastery goals are more likely to foster adaptive and achievement outcomes (Ames, 1992), and will help to create and maintain positive self-perceptions (Linnenbrink & Pintrich, 2002a). Skaalvik and colleagues (Skaalvik, 1996, 1997b; Skaalvik, Valas, & Sletta, 1994) showed that the two types of performance goals have different effects: performance-approach orientations (which they call self-enhancing ego-orientations) tend to foster positive self-concept/self-esteem, whilst performance-avoidance orientations (which they call self-defeating ego-orientations) tend to foster negative self-concept/self-esteem. Skaalvik and colleagues interpret this in two ways: (1) when students are worried about looking stupid their self-concept/self-esteem may be negatively affected, or (2) students with already low self-concept/self-esteem might be occupied with trying not to look stupid. The latter interpretation is consistent with the suggestion that low self-esteem individuals focus more on their failures and weaknesses, whereas high self-esteem individuals are more likely to be motivated to persist in the face of failure (Di Paula & Campbell, 2002). Goal theory is seen as important in education because differences in the way the school environment is perceived are linked to goal adoption. Therefore, teachers can shape the classroom environment to focus on mastery goals.

Discussed earlier in relation to the formation of self-perceptions (within Section 1.2.1), *Attribution theory of motivation* (Weiner, 1974, 1980, 1986) is the study of perceived causation and focuses on attempts to understand why events occur; how we attribute our successes and failures to environmental and personal events shapes our motivational dispositions underlying future action. Therefore, judgements of the causes of one's successes/failures have motivational effects. In school contexts, ability and effort are the most common attributions for success and failure. It has been shown that failure attributed to low ability is more damaging in terms of future progress than failure attributed to low effort (Weiner, 1986). Attribution theory is useful for education because beliefs about the causes of events can be changed through feedback and environmental manipulation. It has been suggested that teachers play a particularly important role in the development of students' academic attributions (Graham, 1984; Licht, 1983; Pintrich & Schunk, 2002). As discussed earlier, causal attributions have been suggested to be one of the key antecedents for the formation of self-perceptions, specifically self-esteem and self-concept. Research has also suggested that self-perceptions and attributions have a reciprocal relationship (e.g. Stipek, 1993; Tennen & Herzberger, 1987).

Expectancy-value theory holds that the degree to which an individual will expend effort on a task is a function of (a) their belief in their ability/skill to be able to perform it successfully and obtain the associated rewards, and (b) the value they place on the reward (the reward can be internal or external). Much of the work in this area has been undertaken by Eccles and colleagues (e.g. Eccles, 1987, 1993, 2007; Eccles et al., 1983; Wigfield, 1994; Wigfield & Eccles, 2000). Expectancy-value theory assumes that people make judgements about the likelihood of success or achieving a goal in a given situation. Individuals are more likely to engage in a task if they expect to be able to do it and if the reward is deemed to be of value. They are not generally motivated to pursue goals if they are perceived as unattainable or if the reward has little or no value. Even a task that has a valued reward will not be attempted if there is no expectation of a successful performance. It has been reported that students who value achievement tasks (those seen as important and interesting) exhibit higher use of cognitive and self-regulation strategies which are in turn associated with better academic performance (Pintrich & DeGroot, 1990). Outcome expectancies and value beliefs are assumed to influence competence perceptions, assessments of task difficulty, and goals (Eccles & Wigfield, 1995; Meece, Wigfield, & Eccles, 1990; Wigfield & Eccles, 2002). They also incorporate feelings about the self and emotional reactions (affective components) (Wigfield & Eccles, 2000). Theoretically, expectancies for success, and competency beliefs such as self-efficacy and self-concept, are seen as distinct constructs. However, empirical work (Eccles & Wigfield, 1995; Eccles, Wigfield, Harold, & Blumenfeld, 1993) has shown that in real-world situations children and adolescents do not distinguish between them.

One particular form of motivation – *intrinsic motivation* – "the doing of an activity for its inherent satisfactions rather than for some separable consequence" (Ryan & Deci, 2000, p. 56), has emerged as a particularly important motivation phenomenon within education. This is mainly due to the fact that it can be systematically catalyzed or undermined by parent and teacher practices (Ryan & Stiller, 1991). Intrinsic motivation is a pervasive and important form of motivation within all areas of human nature. Intrinsically motivated individuals are moved to action for fun or challenge, rather than because of external reasons. It has been argued that positive self-efficacy and self-concept perceptions are strongly related to intrinsic motivation (e.g. Bouffard, 2000; Gottfried, 1990; Harter, 1982; Skaalvik, 1997b; Spinath & Spinath, 2005; Spinath & Steinmayr, 2008; Zimmerman & Kitsantas, 1997), and may even have a causal influence over intrinsic motivation (Deci & Ryan, 1985; Marsh et al., 2005). This is because interpersonal events and structures (e.g. rewards, optimal challenges, communication, positive evaluations, feedback) allow a basic psychological need for competence to be satisfied (Ryan & Deci, 2000).

White's (1959) theory of effectance motivation provided the original basis for this causal hypothesis. He argued that individuals have an inherent desire for competence and an enjoyment of mastery of the environment, and stated that competence-promoting behaviour "satisfies an intrinsic need to deal with the environment" (p. 318). For White, people are motivated by curiosity and interest in developing their competence, rather than by external rewards. This need for competence is the reason why people seek out optimal stimulation and challenging activities. Behaviours and tasks that result in success generate positive self-perceptions and intrinsic reward, and consequently enhance intrinsic motivation for learning. This work forms the basis for Deci and Ryan's (2000) self-determination theory which holds that individuals have three basic psychological needs – competency, relatedness and autonomy – out of which intrinsic motivation develops. White's work also forms the basis for Harter's (1978) effectance theory of motivation which also holds that one experiences increased intrinsic motivation upon successful mastery of challenging tasks. Harter (1981) developed one of the most widely used measures of intrinsic/extrinsic motivation: *A Scale of Intrinsic versus Extrinsic Orientation in the Classroom.* This includes five subscales that examine intrinsic/extrinsic motivation towards learning and mastery in school contexts; each assesses a different motivational component. One central hypothesis of Harter's work is that intrinsic orientation and perceived competence in a given domain would be positively related.

Intrinsic motivation is a critical element in cognitive, educational and social development because optimal knowledge and skills growth requires acting upon one's inherent interests. Educationalists are keen, therefore, to facilitate the development of intrinsic motivation and have suggested that fostering self-perceptions might be one way to do this. The argument is that when individuals believe that they are competent, intrinsic interest for task engagement will increase. However, research is unclear about which self-perception might have the greatest influence over intrinsic motivation. Studies have not directly compared the relative contributions of self-concept and self-efficacy, and research examining the self-esteem–intrinsic motivation relationship is lacking.

There is no theoretical background that makes a strong case for intrinsic motivation having an influence on competence beliefs. All theoretical argument assumes that intrinsic motivation is something that arises out of competence perceptions, rather than the other way round. However, this has rarely been examined. Hence, intrinsic motivation was chosen as the motivational construct of interest here. Furthermore, one of the aims of this research was to determine the extent to which self-perceptions have a causal influence over motivation. However, achievement goal motivations, attributions and expectancy/value motivations are seen as motivational constructs that influence the development of self-perceptions, rather than being influenced by them (although attributions and self-perceptions are viewed as having a reciprocal relationship – they influence one another). Hence, there seems little benefit focusing on these constructs within the context of this research. Furthermore, given the suggestion that expectancies for success and competence perceptions are indistinguishable when measured in school-age children, using expectancy-value theory to examine motivation might have had a confounding influence on the findings.

Accuracy of self-perceptions

Research suggests that the accuracy of an individual's self-perceptions can have indirect consequences for academic functioning. For example, Christensen, Fogarty and Wallace (2002) showed that the more conservative a students' self-efficacy (i.e. the more pessimistic or under-confident their self-efficacy beliefs), the more likely it is that subsequent performance improves. In contrast, when students have very optimistic or over-confident self-efficacy beliefs then subsequent performance deteriorates. This suggests that the level of accuracy in estimating self-efficacy beliefs has implications for a students' education, such that over-confidence is detrimental for their future success and attainment. These results remained even after controlling for cumulative grade point average, average exam performance, improvement/deterioration in exam performance and number of similar classes already completed. The authors argued that students with overly confident self-efficacy beliefs perform poorly in relation to students who exhibit more reasonable or normative self-efficacy judgements because they might have difficulty aligning effort with desired performance. Pajares and Kranzler (1995) found that a general bias towards overly-optimistic self-efficacy beliefs for mathematics capability negatively influenced motivation and behaviour. Similar findings have been reported in studies of self-concept (e.g. Keef & Roush, 1997; Yang, Chuang, & Chiou, 2009). Keef and Roush (1997) demonstrated that the level of pessimism or optimism associated with students' self-concept percepts affects academic development, and also acts as a mediator between other student characteristics and academic performance. They suggested that a tendency towards pessimistic (or under-estimated) self-concept judgements leads to a heavier focus on studying, which in turn leads to improvement in academic outcomes. In contrast, students with optimistic (or over-estimated) self-concept beliefs exhibited inadequate self-regulatory activities and reduced academic performance.

These findings have implications for educational interventions designed to improve self-perceptions. If over-confident self-efficacy or over-optimistic self-concept leads to reduced performance, then enhancing self-perceptions for individuals with already high beliefs might have detrimental effects on self-regulation and subsequent performance, and future aspirations might be unachievable. Furthermore, enhancing self-perceptions for those with under-optimistic self-perceptions to a more normative level might have the unintended effect of reducing motivation levels. Indeed, research has indicated that in some contexts increasing self-perceptions can result in a decline in performance (e.g. Forsyth et al., 2007; Vancouver et al., 2001). The most functional self-efficacy judgements are those that marginally exceed what it is possible to achieve. This helps to increase effort and persistence (Bandura, 1986, 1997). Bandura suggests that whilst it is common for individuals to both over- or under-estimate their self-perceptions, individuals constantly reflect on and evaluate their experiences and current thinking. This in turn impacts on subsequent thought processes and behaviour. Whilst Bandura emphasises that accurate self-appraisals are a prerequisite of successful human functioning, he refers to this self-reflective capacity as part of the normal process of how internal mental structures and self-perceptions develop. Pajares (1997) suggests that the challenge for educators is to help students better understand what they do not know. This will lead to more accurate self-perceptions and the development of more appropriate cognitive strategies for performing tasks, without lowering motivation, effort and persistence.

Ability and previous academic performance

Research has demonstrated that the most powerful predictors of academic performances are general mental ability and previous academic performance (e.g. Shea & Howell, 2000). High ability has also been shown to be predictive of high aspirations (e.g. Chapman & Tunmer, 1997). Therefore, a student's basic academic skills or underlying ability to perform (whether they have special educational needs or learning difficulties, for example) is directly related to whether they are capable of handling academic work, aspiring to achieve and ultimately performing successfully. Research has also demonstrated that self-perceptions are primary psychological mediators of the relationship between mental ability/prior academic performance and current or subsequent academic performance, and that self-perceptions often remain predictive of performance, even after allowing for the influence of mental ability and previous academic performance (e.g. Collins, 1982; Lane, Lane, & Kyprianou, 2004; Marsh et al., 2002; Pajares & Kranzler, 1995). The predictive power of past performance may be reduced over time and therefore self-perceptions become increasingly important with age (e.g. Wood & Bandura, 1989). These findings attest to the importance of including measures of ability and past academic performance in self-perception–academic performance research, thus making it possible to determine whether positive self-percepts contribute to how well one does or aspires to do in the future, over and above the direct contribution provided by ability and prior performance.

1.3.3 Self-perceptions, academic performance and aspirations

Positive self-efficacy, self-concept and self-esteem would in themselves seem to be desirable outcomes. However, to show that self-esteem, self-concept, and self-efficacy are important, research would have to demonstrate that such beliefs and perceptions have important consequences for human functioning. Within education, a multitude of studies have examined the relationships between the various self-perceptions and various academic performance and aspiration indicators. There is a general assumption that enhancing self-perceptions is beneficial to academic functioning and increased aspirations in some way. However, the relative contribution of each of the various self-percepts to these outcomes varies considerably.

Self-esteem (or global self-concept) has not consistently been found to be related to academic achievement – correlations have been positive but weak (e.g. Davis & Brember, 1999; Feinstein, 2000; Hansford & Hattie, 1982). It has been concluded that the associations between self-esteem and academic achievement are "weaker than one might have expected in a society that values doing well in school" (Baumeister et al., 2003, p. 10). Conceptualised in a multidimensional form, self-concept appears to produce stronger relationships with achievement (e.g. Hoge, Smit, & Crist, 1995; Ma & Kishor, 1997; Orr & Dinur, 1995; Skaalvik & Hagtvet, 1990; West, Fish, & Stevens, 1980).

Much of self-esteem and self-concept research has been criticised for failing to include the effects of ability, past performance, and other student factors in their analyses, however. Where research has done so the indication is that the links between performance and self-esteem are based on common underlying factors such as ability and background (e.g. Ross & Broh, 2000; Rubin, Dorle, & Sandidge, 1976, 1977; Schmidt & Padilla, 2003), or that self-esteem only has indirect effects on performance via learning approaches such as deep processing and/or effort (Roman, Cuestas, & Fenollar, 2008). Rubin and colleagues (1976) found that when accounting for socio-economic status and IQ in multiple regression equations designed to predict academic performance, self-esteem accounted for no more than an additional 3% of the total variance explained. Their findings led them to suggest that "while these increases were statistically significant, their practical significance is negligible" (p. 18). Self-concept research has been more alert to controlling for the effects of student factors; domain-specific self-concept has been found to provide robust predictions of performance even after controlling for prior ability (e.g. Marsh, 1990c, 1992d; Marsh et al., 1999; Marsh & Craven, 2006; Marsh & Yeung, 1997a; Shavelson & Bolus, 1982; Skaalvik & Hagtvet, 1990; Skaalvik & Valas, 1999a). Much work has been based on the Marsh/Shavelson academic self-concept structure, however. Research using other models of self-concept is limited. Ma and Kishor (1997) demonstrated weaker relationships in their meta-analysis of mathematics self-concept and performance in mathematics, which included a high number of studies that were not based on the Marsh/Shavelson model. Research is also limited for failing to directly compare self-esteem and self-concept. Research that has done so reported that self-esteem, with its global focus, tended to have weaker relationships with academic performance than domain-specific self-concept (e.g. Marsh, Trautwein, Ludtke, Koller, & Baumert, 2006). These authors failed to include measures of ability, past academic performance or other background factors, however.

Generally, researchers have concluded that self-efficacy perceptions are correlated with outcomes, and that self-efficacy is a good predictor of behaviour. Self-efficacy perceptions have consistently been found to be positively related to academic performance and to mediate the relationships between academic performance and mental ability, skills, previous experience, attainment and other self-perceptions (Pajares, 1996, 1997). In their meta-analysis on the effects of perceived self-efficacy on students' academic outcomes, Multon et al. (1991) reported that self-efficacy perceptions account for around 14% of the variance in students' academic performance. Effect sizes were higher for post-treatment relationships than for pre-treatment or correlational relationships, which, the authors propose, indicates that self-efficacy enhancing interventions may also serve to enhance self-efficacy–performance relationships. Their assessment did not account for the impact of students' prior academic performance or other student factors, but other research indicates that the self-efficacy–performance relationship remains even after controlling for prior ability, although it is substantially weaker (e.g. Pajares & Kranzler, 1995; Pajares et al., 1999; Pajares & Valiante, 1999; Skaalvik & Skaalvik, 2004a). Such findings indicate that a student's belief in their ability to perform well in specific contexts is a predictor, and perhaps a cause, of good academic performance.

There has been some debate as to which of self-efficacy and self-concept more accurately predicts performance. Evidence suggests that self-efficacy has predictive advantages for tasks that are familiar and precisely specified (e.g. Mone et al., 1995; Pajares & Johnson, 1994). Even when self-concept and self-efficacy appear to share some common factors, self-efficacy perceptions are found to be the more predictive of academic performance, even after controlling for ability (D'Amico & Cardaci, 2003; Pietsch et al., 2003). Bong and Skaalvik (2003) suggest that self-efficacy has stronger predictive power than self-concept because it avoids intermixing different elements. They suggest that research would benefit from separating out the competency components of self-concept and examining which of self-efficacy and competency-related self-concept is the most useful for predictive and explanatory purposes. It has been argued that both self-efficacy and self-concept demonstrate stronger within-domain than across-domains relationships (i.e. self-perception for a particular subject relates more strongly with achievement in a matching subject), and that self-efficacy and self-concept perceptions in academic contexts are more predictive of academic outcomes than would be non-academic self-perceptions (Bong & Clark, 1999; Bong & Skaalvik, 2003; Skaalvik, 1997a). This has only been examined using a small range of domains, however (e.g. Marsh, 1993).

In relation to aspirations, relatively few studies have examined the self-esteem–aspiration relationship. Early studies of community college students report positive associations between academic aspirations and self-esteem (Kay & Felker, 1975; Prager & Freeman, 1979; Wingate, 1979). The research concerning the relationship between aspirations and self-concept is contradictory and indicates both that self-concept does (Gottfredson, 1981; Lent, Brown, & Hackett, 1996; Super, 1990) and does not (Looker & Pineo, 1983; Rojewski & Yang, 1997) have an influence on occupational and educational aspirations. There are also indications that self-concept influences coursework selection (Marsh & Yeung, 1997b). It has been suggested, however, that when the effects of socio-economic background, academic ability, and academic achievement are controlled for, the apparent effects of self-concept on aspirations tend to disappear (e.g. Looker & Pineo, 1983).

Research that has included socio-economic status and directly compared the effects of self-esteem and academic self-concept on occupational and educational aspirations (Young, 1997), found that academic self-concept had a direct effect on both types of aspiration and also mediated the effect of classroom environment on these aspirations. The direct effect of self-concept was mitigated by socio-economic status but still proved to be strong. The relationship between self-esteem and aspirations was much weaker, however. Furthermore, there was a larger effect of occupational aspirations on self-esteem, which supports the skill-development model of causality – high occupational aspirations will result in more positive self-esteem.

Perceived self-efficacy is also posited to occupy a central role in the development of aspirations and the strength of commitment to them. Research with adults suggests that self-efficacy appraisals significantly affect occupational development and career pursuits (Bandura, 1997; Betz & Hackett, 1986; Hackett, 1995; Lent, Brown, & Hackett, 1994; Nevid & Rathus, 2007), and that different self-efficacy domains have different predictive utility for career and academic goals (Singer, Stacey, & Lange, 1993). In children, perceived academic, social and self-regulatory self-efficacy contributes to their occupational self-efficacy beliefs, which in turn is linked to high educational aspirations and a strong sense of self-efficacy for scientific, educational, literary, and medical pursuits (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996, 2001). Such research is limited in failing to include the effects of ability, past performance and other student variables, however.

In comparing the various self-perceptions, evidence suggests that the causal relationship between self-efficacy and academic performance is more consistent than that for self-concept and performance. However, previous research does not provide clear evidence for the superior causal utility of self-efficacy because, in the main, self-concept and self-efficacy have not been measured at comparable levels of specificity, and often measurement instruments do not correspond with the level of specificity of the performance indicator (e.g. Pietsch et al., 2003). Furthermore, few studies have explored the predictive and causal relationships among self-concept and self-efficacy in the same study, and those that have, have focused on the self-perceptions in a very restricted number of domains (e.g. Chapman & Tunmer, 1995; Marsh et al., 1991; Mone et al., 1995; Pajares & Miller, 1994; Skaalvik & Rankin, 1998). Findings are also inconsistent. Even fewer studies have included self-esteem, self-concept, and self-efficacy in the same study.

Research has also failed to compare the relative effects of all three self-perceptions on aspirations in the same study, and is unclear about the extent to which self-perceptions play a mediational influence between past academic performance and subsequent academic performance or between past performance and aspirations.

Bong and Clark (1999) suggest that self-efficacy better predicts academic performance, whereas self-concept better predicts affective indices such as anxiety, satisfaction, and self-esteem. They argue that because self-concept perceptions contain affective elements of the self, self-concept should demonstrate stronger relationships with self-esteem, which is a wholly affective construct. Self-efficacy, which primarily consists of cognitive components, should therefore demonstrate weaker relationships with self-esteem and other affective indices. Skaalvik and Bong (2003) speculate that self-efficacy better predicts performance in test-like situations and self-concept better predicts future learning (although this has yet to be tested to any great extent). As these latter authors state, the indication is that "a common underlying theme of self-concept and self-efficacy research is that the perceived self is the major determinant of intrinsic motivation, positive emotion, and performance" (p. 80). However, the extent to which different self-perceptions compare in their purported causal influence over specific aspects of academic functioning is still unclear. More studies are therefore required that compare the respective contributions of self-esteem, self-concept, and self-efficacy to such functioning.

Much of self-perception research, especially that examining academic self-esteem and self-concept, has been criticised for basing 'causal' studies on cross-sectional data, rather than longitudinal designs (Byrne, 1996; Marsh, 1993). However, it is not possible to conclusively determine cause-and-effect relationships when self-perceptions are measured at the same time as outcomes to be predicted. More recent research (e.g. Marsh & O'Mara, 2008) has been based on structural equation modelling techniques which employ longitudinal designs and more rigorous statistical controls (that allow for ability, prior academic performance and socio-economic status, for example), with research suggesting that self-concept has constant reciprocal effects with academic performance, but almost no effects on self-esteem.

Whilst structural equation techniques are useful for establishing the causality of self-perceptions, causality can be better explored by experimentally manipulating self-perceptions and observing the ensuing changes in performance. However, experimental studies into the causal ordering of self-esteem/self-concept and academic performance are limited. This is possibly a consequence of the theoretical argument that self-esteem and self-concept percepts are highly resistant to change and more stable than their corresponding achievements (Marsh & Yeung, 1998; Shavelson & Bolus, 1982), and are therefore not easily susceptible to short-term experimental manipulation (Craven et al., 1991). Experimental designs have long been implemented in research examining the causal relationships between self-efficacy and academic performance. Studies typically involve students participating in various instructional programmes designed to enhance their self-efficacy and subsequent performance on similar tasks. Using experimental designs, self-efficacy has typically been found to have a causal influence over academic performance (Bandura & Locke, 2003; Boyer et al. 2000).

An important study into the causal ordering of self-perceptions was conducted by Valentine et al. (2004). These authors criticise much of previous research examining the self-perception–academic performance relationship for not only using cross-sectional data but for failing to control for prior academic performance. They carried out a meta-analysis of the relation between self-perceptions (self-esteem, self-concept, and self-efficacy) and academic performance using *only* longitudinal studies that controlled for baseline measures of performance. They reported beta effect sizes of .07, .08 and .11 for self-esteem, self-concept, and self-efficacy respectively. Self-efficacy therefore yielded the strongest relationship with academic performance (although the differences between the various self-perceptions were not statistically significant). Effect sizes were, however, stronger for academic self-perception measures, than for subject-specific or global measures (.13, .06 and.07 respectively). In multiple comparisons of academic versus global measures of self-concept (there were no global measures of self-efficacy for comparison), Valentine and colleagues reported an average effect size difference of .13 favouring academic self-concept, with no evidence that global measures predict performance. Taken together, their results support the view that self-beliefs about academic abilities can influence academic performance, and that self-efficacy has the most causal influence, although the authors included an important caveat to their findings:

> …results thus suggest that the level of specificity at which self-beliefs [self-perceptions] are measured is a more important consideration than the particular type of self-system component that such beliefs most closely resemble among those that have been investigated most widely as influences on [academic] achievement. (Valentine et al., 2004, p. 127)

This indicates that measurement specificity could be an issue in self-perception research. However, the authors also suggested that their results must be regarded as tentative as there were too few self-efficacy studies in their sample for their comparisons with other self-perceptions to hold much statistical power. Nevertheless, self-efficacy measures did tend to be associated with greater effect sizes and the authors call for more studies directly comparing the predictive validity of the different types of self-perceptions using experimental, longitudinal designs. Self-perceptions can then be manipulated to determine the effects of any changes on academic functioning.

1.4 The Current Investigation

The research in this thesis was designed to answer a number of questions about the nature of the self and how the various self-perception constructs contribute to academic functioning. The overarching goal was to examine the extent to which self-perceptions are important in the development of academic performance, intrinsic motivation and aspirations in a secondary school context, taking into account the limitations associated with previous research. The research outlined above suggests that the optimal research design in which to examine these issues is to control for the influence of ability, past academic performance and socio-economic status, as well as any other relevant student factors, and to examine the causality of self-perceptions using an intervention designed to enhance them, rather than using cross-sectional data. The design of this research therefore covers these points. This research also compares the relative contributions of *all three* self-perceptions to these specific aspects of academic functioning: something which has been lacking in previous research.

The main research questions to be answered are as follows:

- To what extent is the self important in the development of academic performance, intrinsic motivation and aspirations?
- Which aspect of the self (self-esteem, self-concept or self-efficacy) is the most important in the development of these outcomes?
- It is possible to intervene to enhance self-esteem, self-concept and self-efficacy?
- Do self-perceptions have a causal influence over academic performance, intrinsic motivation and aspirations?

Taking previous research into account, it was expected that the self would be found to be important in the development of all three aspects of academic functioning, with self-efficacy being the most important, especially in relation to academic performance. It was also expected that it would be possible to manipulate both self-efficacy and self-concept, but self-efficacy to a greater degree, and that both of these constructs would have a causal influence over academic functioning. It was not expected, however, that self-esteem could be manipulated, or that self-esteem would be causally influential in academic functioning.

A clear articulation of how self-concept and self-efficacy are related to academic functioning or to any other behavioural outcomes cannot be achieved without a clear understanding of whether or not the constructs represent distinct aspects of personality, or without a clear understanding of their factor structure. The research was therefore also designed to answer two additional main research questions:

- Is the factor structure of self-concept and self-efficacy multidimensional and hierarchical?
- Are self-efficacy and self-concept constructs distinct?

On the basis of previous research, it was expected that both self-concept and self-efficacy would prove to be multidimensional and hierarchical, but that the constructs would not be wholly distinct, i.e. self-efficacy and self-concept components would evidence some conceptual overlap (the background to this is discussed in Chapter 2).

This thesis presents three empirical chapters designed to answer these research questions. The first objective was to establish what the factor structure of self-concept and self-efficacy looks like. This aspect of the research is presented in Chapter 2 – the first empirical chapter. The rationale for the self-efficacy and self-concept measures used is provided, individual factor analyses of the measures are presented in order to determine reliability and assess structure, and an aggregate factor analysis is presented. This combines the self-efficacy and self-concept data in order to determine whether self-efficacy and self-concept are distinct. The analyses in Chapter 2 provide the basis for the remainder of the thesis.

Following on from this, Chapter 3 presents a series of hierarchical regressions. There were two objectives to this stage of the research. One was to establish which type of self-concept/self-efficacy measurement structure best predicts academic functioning. The self-concept and self-efficacy measures used were therefore based on the factor structures derived from the analyses in Chapter 2. The second objective was to establish which aspect of the self is most important for predicting academic functioning. The analyses were therefore aimed at determining which of self-esteem, self-concept or self-efficacy better predict academic performance, intrinsic motivation and aspirations. Additional psychometric, aspiration, demographic, and performance measures were introduced in these analyses. The rationale for their use is presented.

Chapter 4 then presents a series of analyses which examine the effects of an intervention designed to enhance self-perceptions. This intervention was not specifically designed for this study but was already being implemented in many of the schools that provided data. This presented the opportunity, therefore, to examine the effects of an intervention in a real-life context. Building upon the analyses presented in Chapters 2 and 3, self-perceptions were examined pre- and post-intervention to determine whether there were any positive changes following intervention, and if so, whether they were associated with changes in motivation, performance or aspirations. Hence, the main objective of this stage of the research was to use experimental research to determine whether it is possible to enhance self-perceptions, and if so, which one is the most susceptible to intervention. The secondary objective, given any positive intervention findings, was to assess whether self-perceptions have a causal influence over academic functioning, and if so, which one has the greatest influence.

Finally, the concluding chapter of the thesis (Chapter 5) draws together all the strands of the research, focusing on contributions offered in respect of empirical, methodological and theoretical outcomes. Implications of the research for educational researchers and practitioners are discussed, and a critique of self-perception research as an appropriate theoretical framework to be used in the field of educational research, and for educational policy-making, is proffered. The thesis concludes with a discussion of the limitations of the research and offers some ideas for future enquiry.

This thesis therefore explores the relationship between self-concept, self-esteem, and self-efficacy. It examines their factor structure, considers whether the constructs are distinct, determines the extent to which they predict academic outcomes, and finally provides a means of examining whether self-perceptions can be enhanced via intervention and, given that they can, whether they have a causal influence over aspects of academic functioning.

2 PERCEIVED COMPETENCE: A COMMON CORE FOR SELF-EFFICACY AND SELF-CONCEPT?

2.1 Introduction

Both self-efficacy and self-concept contain a common element – perceived competence. Self-efficacy and self-concept differ in the extent to which competence contributes to their composition, however. Self-efficacy is seen as dealing *primarily* with cognitive perceptions of competence. Self-concept, on the other hand, is typically seen as being comprised of affective perceptions *as well as* competency perceptions (e.g. Marsh, 1992b). Pajares and Schunk (2002) provide a framework that distinguishes between the competency elements of self-concept and self-efficacy. Self-efficacy perceptions ask 'can' questions (e.g. Can I do mathematics? Can I make friends? Can I keep out of trouble?), whilst self-concept competency perceptions ask 'being' questions (e.g. Am I good at mathematics? Do I make friends? Do I keep out of trouble?). Conceptually, this implies that self-concept is relatively more concerned with the enduring aspects of a person's overall identity, whereas self-efficacy is a more specific, and not necessarily permanent, attribution of one's ability.

Although self-efficacy and self-concept perceptions are arguably conceptually distinct, a crucial question is whether individuals make this distinction in their own self-perceptions. Skaalvik (1997a) sees the cognitive dimension of self-concept as being differentiated into descriptive (I am a good person) and evaluative (Is my life meaningful? How well do I do?) components. Cognitive or descriptive/evaluative components give rise to the emotional or affective reactions of self-concept (How do I feel about myself as a mathematics learner? Do people like me? I am proud that I keep out of trouble). Taken together the aspects of the self-concept form a self schema that includes beliefs about one's abilities, roles, skills, experiences, and personal characteristics (Jerslid, 1965; Marsh & Shavelson, 1985; West & Fish, 1973), that is accompanied by perceptions of self-esteem – value judgements about the self and one's own self-worth (Pajares, 1996). In contrast, self-efficacy is a context-specific judgement of capability to perform a task or engage in an activity. It is a judgement of one's own confidence which depends mostly on the task at hand (Bandura, 1997).

Rather than treating self-concept and self-efficacy as separate constructs, some researchers suggest that self-concept includes a self-efficacy component (e.g. Bong & Clark, 1999; Pajares, 1996; Schunk, 1991) and even that self-concept may subsume self-efficacy (Lent, Brown, & Gore, 1997). Other researchers (e.g. Damon & Hart, 1982; Eccles, Wigfield, & Schiefele, 1998; Harter, 1990a) argue that affective perceptions should not be considered a part of the self-concept. Such authors discuss the competency/affective distinction as the difference between self-concept and self-esteem. This suggests, then, that studies assessing whether self-efficacy and self-concept are distinct may be confounded due to the inclusion of affective components within the self-concept measure. The main focus of this chapter of the thesis is, therefore, to examine the self-concept/self-efficacy distinction using a self-concept measure that focuses *only* on self-competence.

Theoretically, there are a number of other distinctions between self-efficacy and self-concept (Bong & Clark, 1999; Bong & Skaalvik, 2003; Pajares, 1996). First, self-efficacy judgements are meta-judgements, i.e. reflections about one's mental and physical abilities. They are also typically tied to a specific domain/situation and likely to be based on mastery experiences of a task or activity (Bandura, 1997). In contrast, self-concept judgements are typically more general and less context dependent, and more likely to be based on environmental experiences, and social and self-comparisons (Marsh et al., 1991; Skaalvik, 1997a). Second, there is a difference in temporal orientation: self-concept perceptions are directed towards previous experiences whereas self-efficacy perceptions represent confidence for completing tasks that are imminent. Third, there is a trait/state distinction: self-concept perceptions are seen as habitual and recurring whereas self-efficacy perceptions are viewed as being experienced at a specific point in time (Goetz, Cronjaeger, Frenzel, Ludtke, & Hall, 2010). Thus, self-concept is fairly stable and enduring whilst self-efficacy is relatively malleable and varies in response to individual learning experiences. The use of the term 'trait' in relation to self-efficacy has been questioned. Bandura (1997) and many other self-efficacy researchers (e.g. Bong & Hocevar, 2002) argue that self-efficacy is a context-specific judgement and should not be viewed as one of the personality traits.

2.1.1 Empirical research on the self-efficacy/self-concept distinction

Despite the claimed theoretical differences, the separateness of self-efficacy and self-concept has been challenged. One of the key issues is whether people actually do make distinctions when they are making self-efficacy and self-concept judgements. Studies that have examined whether the constructs are distinct are few, however, and results are inconclusive. Furthermore, there are a number of methodological issues with these studies. Firstly, a number of studies arguing that self-efficacy and self-concept are distinct have included both cognitive and affective elements in the self-concept measure (i.e. Bandalos, Yates, & Thorndike-Christ, 1995; Lent et al., 1997; Marsh et al., 1991). This means that differences between self-efficacy and self-concept may be confounded with differences between cognitive and affective elements. Research into the independence of self-efficacy/self-concept would therefore be better addressed using a more narrowly defined self-concept measure, i.e. one constructed using *primarily* competency components, thereby allowing for more accurate comparisons with self-efficacy items.

The second issue concerns the degree of specificity at which the constructs are measured. There are two types of specificity: domain-specificity and measurement-specificity. Domain-specificity refers to the differentiation of self-percepts across different content areas – academic, social, emotional, etc. Domains can represent broad content areas (e.g. mathematics) or limited skill areas (e.g. algebra in mathematics) and should not be equated with a particular measurement level (Bong & Skaalvik, 2003). Measurement-specificity refers to the level at which perceptions are measured within domains – domain-specific, subject/area-specific, task-specific, or problem/item-specific. Both self-concept and self-efficacy are proposed as being multidimensional, i.e. they have multiple domains. They tend to be measured at different levels of specificity. Self-efficacy measures typically involve task- or problem-specific judgements (Bandura, 1977). Self-concept measures, in contrast, typically involve domain-specific or subject/area-specific judgements (Bong & Clark, 1999; Bong & Skaalvik, 2003). There has recently been a move towards measuring self-efficacy at domain-specific or subject/area-specific levels, partly because term grades and academic achievement test results do not lend themselves to more specific assessment. However, it has been suggested that, by assessing self-efficacy at these more general levels, it becomes increasingly similar to self-concept and therefore self-efficacy/self-concept measures could actually be measuring the same underlying construct (Pajares, 1996).

Research excluding affective self-concept components and examining self-efficacy/self-concept at *different* levels of specificity suggests that they are conceptually and empirically distinct (Ferla, Valcke, & Cai, 2009). In contrast, when self-efficacy and competency-related self-concept are examined at the *same* level of specificity (subject- or task-specific) evidence suggests that they are not conceptually distinct (Pietsch et al., 2003). These authors argue that the overlap is because notions of 'being' that lead to self-concept perceptions are closely linked to self-efficacy meta-judgements, and within academic contexts such as mathematics, 'can' and 'being' questions contain considerable conceptual overlap. However, following their factor analysis of subject- and problem-specific mathematics self-efficacy/self-concept items, Skaalvik and Rankin (1996b) suggested that the level of measurement specificity is more important, having found no evidence that forming items in terms of self-efficacy expectations or self-concept judgements is critical. They reported a second-order common factor underlying academic self-efficacy and competency self-concept (which explained 81% of the variance in the variables) and conjectured that "the traditional distinction between self-concept and self-efficacy may have been overstated in the literature" (p. 8). Their findings support Pajares' (1996) argument that the constructs become increasingly similar when assessed at more general levels. This indicates that we should examine self-efficacy and self-concept at the same level of specificity when assessing whether they are distinct aspects of personality.

The third issue concerns the range of domains utilised. Previous research examining the separateness of self-efficacy and self-concept has tended to focus on narrow, academic domains. They have often also used different levels of specificity for comparisons (typically problem-specific, task-specific or subject/area-specific). Investigations examining the separateness of more general self-efficacy/self-concept content domains are non-existent, as are those looking at the separateness of non-academic self-efficacy/self-concept domains. However, in wider self-perception research, general and non-academic self-percepts are consistently examined in relation to behavioural and academic outcomes. Research into the separateness of the constructs would therefore benefit from examining a wider breadth of domains, at more general levels of specificity.

In studying the distinction between self-efficacy and self-concept three issues therefore need to be controlled: self-concept measures need to concentrate only on cognitive components; the constructs need to be measured at the same level of specificity; and more domains need to be considered. This thesis therefore utilises the *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988) and the *Multidimensional Scales of Perceived Self-Effica*cy (MSPSE; Bandura, 1990, 2001). These measures are especially useful for addressing the self-efficacy/self-concept debate. First, the SPPA was developed to concentrate *only* on cognitive perceptions of competence – the element which Harter believes is the most central to self-concept evaluations. Second, both the SPPA and MSPSE have multiple academic/non-academic domains of comparable domain-specific levels of specificity. Utilising these measures in this research thereby removes issues associated with measuring self-efficacy/self-concept at different levels and allows for a more informative understanding of the nature of any overlap between the constructs across a wider range of contexts. Finally, whilst previous studies investigating whether self-efficacy and self-concept are separate constructs have adhered to Bandura's theoretical recommendations for developing self-efficacy scales (Bandura, 2001) none have used scales directly developed by him. This study therefore adds to the literature by doing so.

Using the MSPSE and SPPA also allows this thesis to examine at what hierarchical level self-efficacy and self-concept might overlap. Given that it has been suggested that self-efficacy and self-concept become increasingly similar at more general levels (Pajares, 1996), we would expect more overlap at higher levels of the hierarchy.

2.1.2 The factor structure of the MSPSE and SPPA

The MSPSE assesses perceived self-efficacy in nine domains relevant to adolescent and preadolescent functioning. The SPPA is also designed to measure adolescents' self-concept in nine domains – eight competence domains as well as an overall self-concept, which Harter calls *Global Self-Worth*. This is not intended as a measure of general or global competence but is analogous to global self-esteem. The domains of the MSPSE and SPPA examine competence in both academic and non-academic contexts (social and behavioural, for example; the domains are discussed in more detail in the Method section of this chapter). Both the MSPSE and SPPA have been widely used in educational and non-educational contexts (e.g. Bandura et al., 1996, 2001; Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Chan, 2001; Dixon, Cross, & Adams, 2001; Ferren, 1999; Groholt, Ekeberg, Wichstrom, & Haldorsen, 2005; Grozdek, Jagodic, & Zarevski, 2007; Pajares & Valiante, 2002; Saigh, Mroueh, Zimmerman, & Fairbank, 1995; Shute, McCarthy, & Roberts, 2007; Usher & Pajares, 2008). Despite this, there is relatively little evidence on the validity of the MSPSE and SPPA factor structures, and factors that have been identified do not always map onto those proposed by the authors.

As regards the MSPSE, only two studies (Choi et al., 2001; Miller et al., 1999) have explored the structure of the full 57-item MSPSE and both have questioned the first-order theoretical fit of Bandura’s subscales. Choi et al. (2001) identified ten factors which differed from those intended by Bandura in several respects. First, they did not find a distinct factor corresponding to Self-Efficacy for Enlisting Social Resources; items from this subscale were instead distributed between factors associated with eliciting Parental and Community Support and with Social Self-Efficacy. Second, they did not find a single factor corresponding to Academic Self-Efficacy but found two separate factors relating to Science/Mathematics Efficacy and Communication/Literacy Efficacy. Third, they decided that items corresponding to Bandura's Self-Regulatory Efficacy factor were more closely associated with Self-Efficacy to Resist High Risk Behaviours and consequently renamed the factor. Miller et al. (1999) found more general support for the nine dimensions but reported that the original item-to-domain alignment did not hold completely and consequently renamed some of the factors. Determining which items loaded onto which factors is difficult, however, as the authors failed to report the pattern or structure matrices and appeared to include the complex variables (those with cross-factor loadings) in more than one factor. Studies that have examined a 37-item subset of the original 57 MSPSE items have suggested a similar three-factor second-order structure to Choi et al. and Miller et al. (Bandura et al., 1996, 1999, 2001; Pastorelli et al., 2001). Pastorelli et al. (2001) have suggested that the structure of self-efficacy may be differently represented by non-English speakers. Bandura himself has not provided any discussion or empirical evidence on the development of the MSPSE and it is possible that he may not have developed the measure with the intention that it would be used for empirical studies.

As regards the SPPA, in her development of the measure Harter (1988) achieved a clear factor structure and acceptable levels of internal consistency with reliabilities ranging from .74 to .93 across the various subscales. However, only five studies have examined its psychometric properties and these have only broadly replicated Harter’s structure. Four (Chan, 2001; Rudasill & Callahan, 2008; Trent, Russell, & Cooney, 1994; Wichstrom, 1995) vary widely in the number of items used – some have included the Global Self-Worth items, others have not used all 40 competency items, or have added in additional items. Worrell (1997) is the only study that utilised the 40 competency items exactly as proposed by Harter. He reported a seven-factor structure, four of which substantially replicated Harter’s factors, but also identified two new factors (*General Attractiveness* and *Low Peer Support*). However, because he included the complex variables in more than one factor, it is difficult to take a clear message from his interpretation. Other findings indicate that the Job Competence scale is meaningless/not applicable to younger adolescents – in that they are too young for a paying job (Rudasill & Callahan, 2008; Trent et al. 1994), and also that the Romantic Appeal items are not relevant (Chan, 2001; Rudasill & Callahan, 2008). Trent et al. (1994) also suggested that the Close Friendship and Social Acceptance factors should be combined into a *General Peer Acceptance* factor (due to a high correlation of .71), whilst Chan (2001) concluded that Close Friendship, Social Acceptance, and Behavioural Conduct items should be more appropriately interpreted as encompassing aspects of interpersonal competence.

Harter excluded the Global Self-Worth subscale from her own factor analyses as she contends that judgements of global self-worth are qualitatively different from self-descriptions in the other eight domains (Harter, 1986, 1988). Harter's model of self-concept allows one to determine the extent to which domain-specific self-concepts affect global self-worth, although global self-worth is not a sum of responses to items on more specific domains but is positioned as an independent construct (Harter, 1990c). For Harter, global self-worth is determined in part by how competent one is in those domains deemed important to the individual. Thus, competence in these domains will bear a different relationship to self-worth for different individuals and global self-worth is therefore unlikely to emerge as a distinct factor. Note that whilst Harter developed the competence domains of the SPPA to assess primarily cognitive judgements of competence ('I do very well at my class work', for example), some items still ask for evaluative feeling judgements. One such item is 'I am not happy with the way I look'. These types of items to some extent approach an affective dimension of the self but do not approximate the primarily affective self-esteem construct.

2.1.3 Research questions

The purpose of this chapter of the thesis was twofold. Few studies have examined the validity of the MSPSE and SPPA and a number of important questions remain unresolved with respect to their structure:

(1) Is it possible to replicate the multidimensional first-order structures proposed by Bandura (1990) and Harter (1988)?

(2) Is there any evidence of a second-order structure to self-efficacy similar to that observed by Choi et al. (2001) and Miller et al. (1999)?

(3) Is there any evidence that self-concept, as represented by the SPPA, is hierarchical?

The first aim of this chapter was therefore to use factor analysis to give a clearer account of the structure of the MSPSE and SPPA. This will not only provide researchers with a better understanding of what the instruments measure, but more generally add to knowledge about how self-efficacy and self-concept perceptions are organised. Thus, as a preliminary step, first- and second-order exploratory factor analyses were performed on the individual MSPSE and SPPA measures.

Having reported these analyses, this chapter then returns to address the central question of independence between self-efficacy and self-concept. The second aim was therefore to use factor analysis to answer a number of questions relating to the nature of the relationship between self-efficacy and self-concept:

(1) Do self-efficacy and self-concept, as represented by the MSPSE and SPPA, capture distinct aspects of personality?
(2) At which hierarchical level is any overlap between the constructs, and can the resulting factors be reliably measured at this level?
(3) Do we actually need separate instruments to measure self-efficacy and self-concept?

To this end, first- and second-order exploratory factor analyses were conducted on aggregate MSPSE and SPPA data. Drawing on Pietsch et al. (2003) and Skaalvik and Rankin (1996b), it was anticipated (1) that the overall structure would be hierarchical and (2) that there would be some evidence of overlap between self-efficacy and self-concept at both the first- and second-order levels of the hierarchy.

Exploratory factor analyses were used here because current literature pertaining to the overlap of self-efficacy and self-concept is limited, and does not offer a sense of models that can be constructed, and because there is a lack of clarity about the structure of the MSPSE and SPPA.

2.2 Method

This thesis is based on three empirical chapters (Chapters 2, 3 and 4), each of which presents a different set of analyses. This section discusses general aspects of the method that are relevant to all three chapters, as well as those that are of specific relevance to this chapter. This section therefore presents the overall design and context for the thesis, a discussion of the various samples to be used in each chapter and the processes used to deal with missing data, the overall data collection procedure, and the overall data preparation, cleaning and screening procedures. The measures to be used in this thesis are also introduced. Those specific to this chapter are discussed in detail here. Those of relevance to subsequent chapters are discussed in detail in the appropriate chapter. This section finishes with a table that gives an overview of the thesis design, summarises the types of analyses that are to be conducted in each of the three empirical chapters, and outlines the sample, missing data procedures and measures to be used for each set of analyses.

2.2.1 Overall design and context for the thesis

The various samples for the empirical chapters of this thesis were based on data drawn from Year 10 cohorts in 10 mainstream, urban and suburban comprehensive mixed secondary schools in one UK city. Schools with a religious foundation, or with a selective entry, were not sampled. Ages at the start of the academic year therefore ranged between 14.0 years and 15.0 years. Schools in the city in question were encouraged (but not required) by the Local Education Authority to adopt an intervention – the *Go For It!* programme – which was designed to promote students self-related perceptions (i.e. self-esteem, self-concept and self-efficacy), motivation, aspirations, and academic performance. The intervention will be discussed in more detail in Chapter 4 but in summary five schools implementing *Go For It!* (GFI) agreed to take part in this research. These were classified as 'intervention' schools. An additional five schools not implementing GFI also agreed to take part in this research. These were classified as 'control' schools. The research design was therefore quasi-experimental; it was left to individual schools to decide whether or not to adopt GFI training and the decision was made independently of this research.

Students were given a battery of self-perception, motivation, and aspiration assessments. These were measured on three occasions: (a) immediately prior to the intervention (*baseline*), (b) immediately following the end of the intervention (*post-test*), and (c) between 17-24 weeks after the end of the intervention (*follow-up*). Students in control schools completed the same measures at the same time intervals and on similar dates as the intervention group. Table 2.1 shows the dates of GFI programme delivery relative to each intervention school, and the testing dates for intervention and control schools. As far as possible, intervention and control schools were matched in terms of students' socio-economic status and Year 9 academic performance (the year prior to the intervention). Socio-economic status was estimated on the basis of the proportion of students that were eligible for free school meals, and on ACORN scores – these give a rough estimate of households' socio-economic status based on their postcode[1]. Matching of Year 9 academic performance was achieved using Key Stage 3 SAT[2] results (English, Mathematics and Science). Socio-economic and performance data were obtained from central records held by the Local Education Authority.

Table 2.1 Dates of *Go For It!* programme delivery for intervention schools, and dates of testing sessions for intervention and control schools

School / group	Programme delivery date	Testing dates		
		Baseline	Post-test	Follow-up
Intervention				
School A1	Early Jan 04	17 Dec 03	9, 16 + 23 Jan 04	14 Jul 04
School B1	End June 04	9 Jun 04	12 Jul 04	6 Dec 04
School C1	End Feb 04	24 Feb 04	1 Mar 04	28 Jun 04
School D1	Feb – June 04	27 Jan 04	14 Jul 04	10 Dec 04
School E1	Nov 03 – Jan 04	21 Oct – 5 Nov 03	4 + 11 Feb 04	26 May – 7 Jul 04
Control				
School A2	–	1 + 8 Dec 03	6 Jul 04	3 Nov 04
School B2	–	28 May 04	11 Jun 04	28 Jan 05
School C2	–	10 Dec 03	26 Mar 04	21 Jun 04
School D2	–	9 Mar 04	8 Jun 04	16 Nov 04
School E2	–	11 Mar 04	6 Jul 04	3 Nov 04

Note: School A1 was matched with School A2, School B1 was matched with School B2, etc.

2.2.2 Sample

The three empirical chapters for this thesis in turn present a series of factor analyses (this chapter), regression analyses (Chapter 3), and intervention analyses (Chapter 4). The samples used for each set of analyses, and the full sample from which these were derived,

[1] ACORN stands for 'A Classification of Residential Neighbourhoods'. This classification includes every street in the country, fitting into 17 distinct Groups, which in turn contain 56 'typical' ACORN neighbourhood categories (called 'Types'). The data reaches from ACORN Group 1 (wealthy achievers, suburban areas) / Type 1 (wealthy suburbs, large detached houses) to ACORN Group 17 (people in multi-ethnic, low-income areas) / Type 56 (multi-ethnic, high unemployment, overcrowding). The full set of categories can be seen at http://www.caci.co.uk/acorn-classification.aspx. ACORN profiles by postcode can be viewed at: http://www.upmystreet.com

[2] SAT (Standard Assessment Tests) are curriculum tests given at the end of Year 2 (Key Stage 1), Year 6 (Key Stage 2) and Year 9 (Key Stage 3). They are used as a measure of students' ability, development and progress in core subjects, compared with other students born in the same month. For any age group, a given numerical value has the same meaning relative to the National average for that group. Schools use Year 9 SAT scores to predict possible outcomes at GCSE.

are discussed in turn below, together with a discussion of the missing data analyses and subsequent procedures for dealing with missing data.

Full sample

A total of 1497 students (mean age = 14.95 years at the start of the study, SD = 0.34) provided data at one or more occasions. This constituted the 'full sample' for the thesis and provided a basis for the various samples used in subsequent empirical chapters. The full sample was 51.4% female and 90% Caucasian. The largest minority ethnic group were Asian (7.3%; defined as from the Indian Subcontinent). Table 2.2 gives a breakdown of the characteristics of the full sample broken down by intervention/control group and by school. There were a greater number of students in the control group than in the intervention group (814 compared to 683). Differences between the two groups were minimal; there were a significantly greater proportion of students with identified special educational needs in the intervention sample ($p < .01$), and the control sample had marginally higher mathematics scores ($p < .05$), but there were no other differences. Matching of schools in the intervention and control groups was not perfect, however. This was partly because, with one exception (School C1), schools adopting the GFI intervention tended to be from more socially disadvantaged areas.

Table 2.2 Characteristics of the full sample (N = 1497)

School / group for comparison[a]	Sample size	Gender (% female)	Mean ACORN scores[b]	Free school meals (% yes)	Special educational needs (% yes)	Mean Key Stage 3 SAT scores[b]		
						Maths	English	Science
Intervention								
School A1	132	53.0%	35.1 (5.7)	36.4%	20.5%	5.1 (1.1)	4.9 (1.0)	5.1 (0.9)
School B1	155	54.8%	34.5 (9.5)	16.8%	22.6%	5.3 (1.3)	5.5 (1.1)	5.1 (1.0)
School C1	141	51.8%	20.0 (12.2)	9.9%	10.6%	5.9 (1.2)	5.4 (1.0)	5.8 (0.9)
School D1	167	49.7%	34.1 (7.6)	19.8%	28.1%	5.3 (1.3)	5.5 (0.9)	5.3 (1.1)
School E1	88	53.4%	41.3 (6.1)	43.2%	51.1%	5.0 (1.5)	4.8 (1.1)	4.7 (1.3)
Overall	*683*	*52.4%*	*32.5 (11.0)*	*23.3%*	*24.7%*	*5.4 (1.3)*	*5.3 (1.0)*	*5.2 (1.1)*
Control								
School A2	193	56.5%	31.8 (8.5)	23.3%	10.9%	5.5 (1.1)	4.7 (0.8)	5.1 (0.9)
School B2	115	43.5%	28.3 (14.2)	15.7%	23.5%	5.6 (1.4)	5.2 (1.2)	5.6 (1.1)
School C2	170	56.5%	35.7 (7.1)	25.9%	14.1%	5.7 (1.2)	5.4 (1.0)	5.4 (1.1)
School D2	202	46.5%	32.4 (7.4)	15.3%	12.4%	5.6 (1.2)	5.9 (0.9)	5.6 (0.9)
School E2	134	46.3%	33.4 (11.1)	18.7%	19.4%	5.0 (1.2)	4.7 (1.0)	4.9 (1.2)
Overall	*814*	*50.5%*	*32.6 (9.7)*	*20.0%*	*15.1%*	*5.5 (1.2)*	*5.2 (1.1)*	*5.3 (1.1)*
Between groups probability[c]	-	.458	.861	.127	< .001	.042	.478	.069
Full sample	1497	51.4%	32.5 (10.3)	21.5%	19.5%	5.4 (1.3)	5.2 (1.1)	5.3 (1.1)

Note: ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.
[a]School A1 was matched with School A2, School B1 was matched with School B2, etc. [b]Standard deviations in parentheses. [c]Mean differences between the intervention and control samples were examined using the independent samples t-test for equality of means (two-tailed test).

Missing data analysis

All data were entered into SPSS (*Statistical Package for the Social Sciences*; Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Missing data analyses (using SPSS Missing Value Analysis) were run on the psychometric measures (self-efficacy, self-esteem/self-concept[3], and motivation) for each time of testing (baseline, post-test and follow-up) to determine the overall amount of missing data, how the missing data were distributed across variables and cases, and whether the missing data were MCAR (missing completely at random)[4]. The missing data characteristics of the full sample are shown in Table 2.3. The percentage of missing data was relatively high: between 19.4% and 37.6% overall, depending on the psychometric measure and occasion of testing. Attrition was high with a large number of students failing to provide a complete set of responses at one or more sessions; of the total 1497 students, 1281 provided responses at baseline, 1047 at post-test and 1017 at follow-up, but only 691 students provided responses at all three testing sessions. This was partly due to students being absent on the day the measures were administered, although missing responses were recorded where students failed to provide their name, or provided a fictitious or illegible name. The amount of missing data was considerably higher at post-test and follow-up than at baseline for all the psychometric measures. A high number of cases (between 44.1% and 68.5% across measures/occasions) had at least one missing value, and 100% of variables across all measures/testing occasions were missing at least one case value.

[3] Missing data analysis was run on pooled self-concept and self-esteem responses as the measures were completed at the same time (discussed in Section 2.2.4: Data collection procedure).
[4] Responses are MCAR (missing completely at random) if missing values are randomly distributed across all observations such that the probability of missing data on one variable is not related to the value of other variables in the dataset (Allison, 2000).

Table 2.3 Missing data characteristics of the psychometric measures: Full sample (N = 1497)

Psychometric measure	Time of testing	% of missing data	% of cases with at least one missing value	% of variables with at least one missing value	Is the missing data MCAR?[a]
Self-efficacy	Baseline	19.4%	44.1%	100%	no (p < .001)
	Post-test	33.8%	48.4%	100%	no (p < .001)
	Follow-up	37.6%	53.9%	100%	no (p < .001)
Self-esteem & Self-concept	Baseline	20.4%	48.6%	100%	no (p < .001)
	Post-test	35.3%	61.9%	100%	yes (p = .230)
	Follow-up	36.5%	68.5%	100%	no (p < .001)
Motivation	Baseline	18.7%	47.2%	100%	no (p < .001)
	Post-test	34%	56.5%	100%	no (p < .001)
	Follow-up	37%	59.2%	100%	no (p < .001)
All measures	Baseline	19.6%	72.9%	100%	no (p < .001)
	Post-test	34.3%	78.6%	100%	no (p < .001)
	Follow-up	37.1%	82.2%	100%	no (p < .001)
All	All	30.3%	96.9%	100%	–[b]

[a]MCAR: missing completely at random. MCAR was tested using Little's MCAR test in SPSS Missing Value Analysis. [b]Missing value analysis algorithm failed to converge in 100 iterations, probably due to the high number of variables and large sample size.

Self-perception factor analysis sample (Chapter 2 analyses)

The self-perception factor analysis sample, on which the analyses in this chapter of the thesis were based, was created using a subsample of the 'full sample'. Intervention and control students' responses were included. The preference was to use baseline responses. However, in order to maximise the size of the sample, for control students only, post-test responses were used where they had not provided responses at baseline, or follow-up responses were used where they had not provided responses at baseline or post-test. As data collecting occasions were differentially spread over the year depending on the school, it was acceptable to use this approach. In contrast, for intervention students, *only baseline* responses were included. This was because post-test/follow-up responses may have been influenced as a result of the intervention and this could have affected the resulting factor structures.

Dealing with missing data

Because it has been suggested that imputation or data substitution methods may artificially increase the clarity of factor structures (Roth, 1994), listwise deletion of missing data (where a case is excluded if one or more values are missing) was implemented for the self-perception factor analysis sample. Thus, responses were included only if complete data were available for both the self-efficacy and self-concept measures.

The final self-perception factor analysis dataset therefore consisted of responses from 778 students (mean age = 15.04 years, SD = 0.41), with 479 control students and 299 intervention students. Each of the 10 schools was represented in this sample (school sample sizes ranged from 38 to 126). The sample was 55.7% female and 90.6% Caucasian (6.8% were Asian). Table 2.4 shows the characteristics of the full sample, the self-perception factor analysis sample, and the participants excluded from this sample. Matching of the various samples was not perfect. Comparison of the self-perception factor analysis sample and the excluded participants shows significant differences between groups for gender ($p < .01$), special educational needs, and the three academic performance variables (all at $p < .001$). Comparison of demographic and performance variables between the full sample and the self-perception factor analysis sample shows a slightly higher proportion of special educational needs students in the full sample, but no other differences.

Table 2.4 Comparison of the full sample, the self-perception factor analysis sample, and the excluded participants (those not in the self-perception factor analysis sample)

Sample	Sample size	Gender (% female)	Mean ACORN scores[a]	Free school meals (% yes)	Special educational needs (% yes)	Mean Key Stage 3 SAT scores[a]		
						Maths	English	Science
Full sample	1497	51.4%	32.5 (10.3)	21.5%	19.5%	5.4 (1.3)	5.2 (1.1)	5.3 (1.1)
Factor analysis sample	778	55.7%	33.0 (9.8)	20.3%	13.0%	5.6 (1.2)	5.4 (1.0)	5.4 (1.0)
Excluded participants	719	46.7%	32.0 (10.8)	22.8%	26.6%	5.2 (1.3)	5.1 (1.1)	5.1 (1.1)
Between groups probability[b]	-	.001	.076	.240	< .001	< .001	< .001	< .001

Note: ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.
[a]Standard deviations in parentheses. [b]Mean differences between the self-perception factor analysis sample and excluded participants were examined using the independent samples t-test for equality of means (two-tailed test).

Regression sample (Chapter 3 analyses)

The self-perception factor analysis sample of 778 participants, discussed above, was also utilised as the 'regression sample', on which the Chapter 3 analyses were based. This sample formed a cross-sectional dataset, i.e. one that relates to one time period, which was used for subsequent regression analyses examining relationships between the variables.

Intervention sample (Chapter 4 analyses)

The 'intervention' sample, used for the analyses in Chapter 4, was created using a subsample of the 'full sample'. Because the aim of Chapter 4 was to examine the short and longer term effects of an intervention, it was necessary to create a longitudinal dataset that included data at each of the three different time periods. There was a high level of missing data in the full sample (30.3%; see Table 2.3), some of which resulted from students failing to provide responses at one or more testing sessions, some of which resulted from students failing to respond to specific items. As a result, missing responses were dealt with in two stages.

Dealing with missing data

Within the full sample there was substantial attrition between baseline and post-test, and again between post-test and follow-up. Therefore, listwise deletion was initially used to reduce the amount of missing data; only data from the 691 students that had provided a set of responses at each of the three times of testing were used as a basis for the intervention sample. There was still missing data in this sample, however, and it was necessary to use additional procedures to deal with this.

The remainder of the missing data was dealt with using data imputation: 'filling in' the missing data with a value that approximates the 'real' value (Schafer, 1997). Missing value analyses performed on the dataset of 691 students showed that overall the psychometric measures (self-efficacy, self-concept/self-esteem, and motivation) had 5.6% missing data, compared to 30.3% in the full sample. Responses within measures/testing periods were *not* missing completely at random (MCAR). It has been suggested that when the missing data is not MCAR, or when missing data amounts are large (more than 5%), then imputation methods of data substitution should be utilised, rather than discarding cases with missing data (i.e. listwise deletion) (Tabachnick & Fidell, 2001). Listwise deletion of incomplete cases can severely reduce the sample size (in this research, listwise deletion would have resulted in only 46 students that had provided a complete set of psychometric data for each time of testing). Such a reduction in sample size may seriously reduce analytic power and included respondents may differ in important characteristics from excluded respondents. Subsequent findings may therefore be biased (Acock, 2005; Allison, 2000; Heitjan, 1997). Therefore, as the amount of missing data was large and the data were not MCAR, imputation methods were used to deal with the remainder of the missing data.

Examination of the dataset of 691 students revealed that the missing data within the psychometric variables were generally a result of item-level missing, not instrument-level missing data[5], i.e. missing data was mainly spread across subscales within measures, as

[5] *Instrument-level* missing data refers to situations where an entire 'measurement instrument' is missing, such as where a variable is measured using a single item, or where an entire test is missing for some respondents, for example, in the case of repeated measures designs. *Item-level* missing data refers to data that is missing in multiple-item scales. That is, in situations where participants have failed to complete a few items within a

opposed to there being entire subscales missing. Roth and colleagues (Roth & Switzer, 1999; Roth et al., 1999) suggest that when data is missing at the item level, rather than at the instrument level, then it is appropriate to use person mean substitution to impute missing data. Imputing using the person mean involves taking the mean of all items measuring the same construct, or the mean of items measuring a particular subscale, for a given person, and using that mean to estimate the missing values. Imputing the person mean therefore estimates missing scores based on a respondent's observed scores on other items within a given scale/subscale. Since items within a scale/subscale are typically correlated due to a latent trait structure, person mean substitution estimates the score to be imputed using information on a respondent's latent trait position (Bernaards & Sijtsama, 2000). This method therefore preserves the relationships among the items factored within a measurement scale or subscale, and the imputed value is conditional on other information provided by the respondent. Roth et al. (1999) have shown that this is a simple and robust technique across multiple statistics (correlations, multiple R's and regression weights) and is robust to average inter-item correlations, and various types of missing data patterns (see also Bernaards & Sijtsama, 2000; Downey & King, 1999).

Person mean substitution was therefore chosen to deal with the remainder of the missing data in the intervention sample[6]. Missing data were estimated across each subscale within each psychometric measure. At least one item is needed in each subscale to impute using person mean substitution. Hence, students' responses were included if they had provided at least one response for *each* of the self-perception and motivation *factors* (subscales), at each of the three times of testing (the self-perception factors are introduced later in this chapter; the motivation factors are introduced in Chapter 3). Chapter 4 analyses were based on three identified motivation factors and all the subscales of the MSPSE, the SPPA and the First- and Second-Order Competency measures (new self-perception measures introduced later in this chapter). All except the Second-Order Competency factors were included in the imputation process; these were created from the First-Order Competency

---

scale/subscale that has a single factor model underlying all the responses, and where the items are likely to have moderate to relatively high intercorrelations (Roth & Switzer, 1999; Roth, Switzer, & Switzer, 1999).

[6] Note that imputation was not used to deal with all of the missing data within the full sample as it was thought important to impute responses based on a student's own scores. Imputation within the full sample would have necessitated whole sections of a students' data (all baseline data, for example) being based on other students' responses for that same time of testing. It was not possible to impute a student's responses for one time of testing using their responses at another time of testing because expected changes to perceptions over time would skew the imputed scores. Therefore, listwise deletion was used for the first stage of the missing data procedure.

factor scores and therefore did not need to be included in the imputation process. The resulting intervention sample was comprised of 480 students.

Prior to imputation, a missing data check was run on the data provided by these 480 students using SPSS Missing Value Analysis. The psychometric measures (self-efficacy, self-concept/self-esteem, and motivation) were assessed for each time of testing (note that the Competency measures were not analysed separately as they were derived from the self-efficacy and self-concept items). Missing data analysis was run on pooled self-concept and self-esteem responses as the measures were completed at the same time (discussed in Section 2.2.4: Data collection procedure). The missing data characteristics are shown in Table 2.5.

Table 2.5 Missing data characteristics of the psychometric measures prior to imputation: Final intervention sample (N = 480)

Psychometric measure	Time of testing	% of missing data	% of cases with at least one missing value	% of variables with at least one missing value	Is the missing data MCAR?[a]
Self-efficacy	Baseline	0.6%	22.7%	64.9%	no ($p = .017$)
	Post-test	0.5%	16.7%	59.6%	no ($p = .002$)
	Follow-up	0.6%	18.1%	70.2%	no ($p < .001$)
Self-esteem & Self-concept	Baseline	1.4%	32.3%	100%	no ($p < .001$)
	Post-test	1.8%	40.2%	100%	no ($p = .007$)
	Follow-up	1.9%	46.3%	100%	no ($p < .001$)
Motivation	Baseline	1.7%	33.5%	100%	no ($p = .030$)
	Post-test	1.5%	28.5%	100%	no ($p < .001$)
	Follow-up	1.4%	30.8%	96.7%	no ($p = .001$)
All measures	Baseline	1.1%	62.1%	84.8%	no ($p = .002$)
	Post-test	1.2%	62.7%	82.6%	no ($p < .001$)
	Follow-up	1.2%	65.2%	86.4%	no ($p < .001$)
All measures	All	1.2%	90.2%	84.6%	–[b]

[a]MCAR: missing completely at random. MCAR was tested using Little's MCAR test in SPSS Missing Value Analysis. [b]Missing value analysis algorithm failed to converge in 100 iterations, probably due to the high number of variables and large sample size.

As intended, the percentage of missing data was low: between 0.05% and 1.9%, depending on the measure and occasion of testing, compared to between 19.4% and 37.6% in the full sample. There were relatively similar amounts of missing data across all three testing sessions, for all measures. A moderate number of cases had at least one missing value (between 16.7% and 46.3% depending on measure/occasion). Across all measures/testing occasions, a high number of variables were missing at least one case value (between 59.6% and 100%). These proportions were also much less than the full sample; overall (for all measures and all times of testing), there was 1.2% of missing data within the psychometric measures, compared to 30.3% for the full sample.

There were also missing data within some of the other variables used for the analyses in this chapter (i.e. the demographic indices, indicators of academic performance, and measures of aspiration: introduced in Chapter 3). The amount was small, however (7.3% across all the variables/times of testing). Given that all these variables were created using single response items, the missing data for these variables was classed as 'instrument-level'. Roth and Switzer (1999) suggest that imputation procedures do not provide particularly accurate estimation of instrument-level missing values, "probably because variables available for imputation are not too highly related to each other" (p. 3). In this instance, they suggest that listwise deletion of missing data has a lower level of bias than do imputation procedures. Taking this into account, where the analyses use demographic, performance and aspiration indices, listwise deletion of missing data was utilised (using the default option in SPSS). Sample sizes for the analyses that used these variables were therefore slightly reduced.

Characteristics of the intervention sample

The resulting intervention sample consisted of responses from 480 students (mean age at baseline = 14.24 years, SD = 0.35). Within this, there were 275 control students and 205 intervention students. The sample was 55.6% female, 89.9% Caucasian (7.7% were Asian). Table 2.6 shows the characteristics of the full and intervention samples, broken down by school and group. This table also shows the overall characteristics of the students that were excluded from the intervention sample. Although the intervention sample was substantially smaller than the full sample, its characteristics were roughly similar, showing significant differences only for special educational needs and KS3 English. The differences between the intervention sample and the excluded participants were more substantial, however, with significant differences between these groups for all but the free school meals indicators. Each of the 10 schools was represented in the intervention sample. It should be noted, however, that some schools were more poorly represented than others, particularly Schools E1 and E2.

Table 2.6 Characteristics of the full sample, the intervention sample and excluded participants

School / group for comparison[a]	Sample size	Gender (% female)	Mean ACORN scores[b]	Free school meals (% yes)	Special educational needs (% yes)	Mean Key Stage 3 SAT scores[b]		
						Maths	English	Science
Full sample								
Intervention								
School A1	132	53.0%	35.1 (5.7)	36.4%	20.5%	5.1 (1.1)	4.9 (1.0)	5.1 (0.9)
School B1	155	54.8%	34.5 (9.5)	16.8%	22.6%	5.3 (1.3)	5.5 (1.1)	5.1 (1.0)
School C1	141	51.8%	20.0 (12.2)	9.9%	10.6%	5.9 (1.2)	5.4 (1.0)	5.8 (0.9)
School D1	167	49.7%	34.1 (7.6)	19.8%	28.1%	5.3 (1.3)	5.5 (0.9)	5.3 (1.1)
School E1	88	53.4%	41.3 (6.1)	43.2%	51.1%	5.0 (1.5)	4.8 (1.1)	4.7 (1.3)
Overall	*683*	*52.4%*	*32.5 (11.0)*	*23.3%*	*24.7%*	*5.4 (1.3)*	*5.3 (1.0)*	*5.2 (1.1)*
Control								
School A2	193	56.5%	31.8 (8.5)	23.3%	10.9%	5.5 (1.1)	4.7 (0.8)	5.1 (0.9)
School B2	115	43.5%	28.3 (14.2)	15.7%	23.5%	5.6 (1.4)	5.2 (1.2)	5.6 (1.1)
School C2	170	56.5%	35.7 (7.1)	25.9%	14.1%	5.7 (1.2)	5.4 (1.0)	5.4 (1.1)
School D2	202	46.5%	32.4 (7.4)	15.3%	12.4%	5.6 (1.2)	5.9 (0.9)	5.6 (0.9)
School E2	134	46.3%	33.4 (11.1)	18.7%	19.4%	5.0 (1.2)	4.7 (1.0)	4.9 (1.2)
Overall	*814*	*50.5%*	*32.6 (9.7)*	*20.0%*	*15.1%*	*5.5 (1.2)*	*5.2 (1.1)*	*5.3 (1.1)*
Total	1497	51.4%	32.5 (10.3)	21.5%	19.5%	5.4 (1.3)	5.2 (1.1)	5.3 (1.1)
Intervention sample								
Intervention								
School A1	56	64.3%	20.6 (5.6)	33.9%	17.9%	5.0 (0.9)	5.0 (0.9)	5.1 (0.8)
School B1	52	61.5%	21.4 (9.5)	23.1%	13.5%	5.4 (1.3)	5.5 (1.0)	5.4 (1.3)
School C1	42	57.1%	37.1 (11.5)	11.9%	4.8%	6.4 (1.3)	5.7 (1.0)	6.2 (0.9)
School D1	46	50.0%	22.8 (8.2)	17.4%	8.7%	5.7 (1.3)	5.6 (0.8)	5.5 (1.0)
School E1	9	66.7%	16.8 (7.6)	11.1%	33.3%	5.8 (1.5)	5.7 (1.5)	5.5 (1.1)
Overall	*205*	*59.0%*	*24.6 (10.8)*	*22.0%*	*12.7%*	*5.6 (1.3)*	*5.5 (1.0)*	*5.5 (1.1)*
Control								
School A2	66	56.1%	24.2 (8.2)	22.7%	4.5%	5.6 (1.1)	4.8 (0.8)	5.3 (0.9)
School B2	44	25.0%	31.6 (13.6)	13.6%	11.4%	6.2 (1.2)	5.5 (1.1)	6.1 (1.0)
School C2	77	66.2%	20.9 (7.0)	23.4%	6.5%	6.0 (1.1)	5.8 (0.9)	5.7 (1.0)
School D2	73	54.8%	23.9 (8.3)	15.1%	5.5%	5.8 (1.1)	5.9 (0.8)	5.7 (0.9)
School E2	15	46.7%	25.1 (12.3)	20.0%	6.7%	4.8 (1.1)	4.7 (1.0)	4.9 (1.1)
Overall	*275*	*53.1%*	*24.4 (9.8)*	*19.3%*	*6.5%*	*5.8 (1.1)*	*5.5 (1.0)*	*5.6 (1.0)*
Total	480	55.6%	24.5 (10.2)	20.4%	9.2%	5.7 (1.2)	5.5 (1.0)	5.6 (1.0)
Excluded participants	1089	49.4%	23.0 (10.3)	22.0%	24.4%	3.3 (1.8)	3.8 (1.8)	3.5 (1.7)
Between groups probabilities[c]								
Intervention vs. full samples	-	.196	.866	.476	.027	.076	.013	.147
Intervention vs. excluded Ps	-	.023	.010	.476	< .001	< .001	< .001	< .001

Note: ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.
[a]School A1 was matched with School A2, School B1 was matched with School B2, etc. [b]Standard deviations in parentheses. [c]Mean differences between the intervention sample and the full sample, and the intervention sample and the excluded participants, were examined using the independent samples t-test for equality of means (two-tailed test).

2.2.3 Measures

Students completed a series of four psychometric measures: self-efficacy, self-concept, self-esteem, and academic intrinsic motivation. They also completed questions that asked about their educational and occupational aspirations, and about their subjective experiences of the intervention (intervention process questions). In addition, a broad range of background information was obtained for each student from Local Education Authority records. The self-efficacy and self-concept measures are pertinent to this chapter of the thesis and are therefore discussed below. The remainder of the measures and background information are discussed in more detail in the relevant chapters of the thesis.

Self-efficacy

Self-efficacy was measured using all nine domains (57 items) of the *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990, 2001). These assess perceived domain-specific self-efficacy across a range of academic and non-academic contexts: *Self-Efficacy for Academic Achievement* and *Social Self-Efficacy*, for example. All items are of the form 'How well can you (perform specific task or process)?' Following piloting of the MSPSE, a number of wording changes were made to the original items to facilitate understanding and to take account of cultural differences. These are discussed in detail in Appendix A.1. Students responded on a 7-point scale from 1 = *not well at all* to 7 = *very well*. Scores within each subscale are typically added together and averaged to give a final score for each subscale. Internal reliabilities (Cronbach's Alpha; Cronbach, 1951) for the MSPSE subscales using the present sample ($N = 778$) ranged from $\alpha = .62$ (Enlisting Social Resources) to $\alpha = .91$ (Self-Efficacy for Self-Regulated Learning). The MSPSE subscales/items, reflecting the revised wording, with internal reliabilities and descriptive statistics, are shown in Table 2.7. The full measure as presented to students is shown in Appendix A.2.

Table 2.7 Bandura's (1990) *Multidimensional Scales of Perceived Self-Efficacy*, with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the self-perception factor analysis sample (N = 778)

	Subscales / items (all items are prefixed with 'How well can you…?')	α	M	SD
*Self-Efficacy in Enlisting Social Resources (*B1: *socr)*		.62		
1	…get teachers to help you when you get stuck on schoolwork		4.67	1.32
2	…get another student to help you when you get stuck on schoolwork		5.03	1.35
3	…get adults to help you when you have social problems		4.87	1.53
4	…get a friend to help you when you have social problems		5.53	1.36
*Self-Efficacy for Academic Achievement (*B2: *aca)*		.84		
5	…learn general mathematics		4.94	1.40
6	…learn algebra		4.36	1.65
7	…learn science		4.79	1.41
8	…learn biology		4.79	1.41
9	…learn reading, writing and language skills		5.23	1.32
10	…learn to use computers		5.89	1.20
11	…learn a foreign language		3.79	1.62
12	…learn social studies		4.52	1.29
13	…learn English grammar		4.80	1.35
*Self-Efficacy for Self-Regulated Learning (*B3: *sregl)*		.90		
14	…finish your homework assignments by deadlines		4.78	1.64
15	…study when there are other interesting things to do		4.01	1.55
16	…concentrate on school subjects		4.64	1.26
17	…take notes in class		4.40	1.37
18	…use the library to get information for schools assignments		4.11	1.67
19	…plan your schoolwork		4.54	1.34
20	…organise your schoolwork		4.75	1.36
21	…remember information that is presented in class and in textbooks		4.49	1.36
22	…arrange a place to study without distractions		4.59	1.47
23	…motivate yourself to do schoolwork		4.43	1.37
24	…join in class discussions		4.79	1.54
*Self-Efficacy for Leisure-Time Skills & Extracurricular Activities (*B4: *exa)*		.79		
25	…learn sports skills		5.02	1.72
26	…learn dance skills		4.11	1.99
27	…learn music skills		4.39	1.65
28	…do the kinds of things needed to be a member of the school newspaper		3.89	1.59
29	…do the kinds of things needed to be a member of the school government		3.93	1.40
30	…do the kinds of things needed to take part in school plays		3.91	1.60
31	…do regular physical education activities		4.93	1.65
32	…learn the things needed for team sports		5.19	1.58
*Self-Regulatory Efficacy (*B5: *srege)*		.84		
33	…resist peer pressure to do things in school that can get you into trouble		4.98	1.51
34	…stop yourself from skipping school when you feel bored or upset		5.36	1.69
35	…resist peer pressure to smoke cigarettes		5.46	2.09
36	…resist peer pressure to drink alcohol		4.82	2.09
37	…resist peer pressure to smoke marijuana		5.90	1.78
38	…resist peer pressure to take ecstasy		6.53	1.23
39	…resist peer pressure to use crack (cocaine)		6.57	1.16
40	…resist peer pressure to have sexual intercourse		5.23	1.91
41	…control your temper		4.17	1.83
*Self-Efficacy to Meet Others' Expectations (*B6: *othe)*		.84		
42	…live up to what your parents expect of you		4.93	1.47
43	…live up to what your teachers expect of you		1.60	1.51
44	…live up to what your peers expect of you		4.89	1.40
45	…live up to what you expect of yourself		5.38	1.44
*Social Self-Efficacy (*B7: *soce)*		.78		
46	…make and keep friends of the opposite sex		5.79	1.28
47	…make and keep friends of the same sex		6.01	1.21

Table continued over the page…

Table 2.7 continued…

	Subscales / items (all items are prefixed with 'How well can you…?')	α	M	SD
48	…carry on conversations with others		5.47	1.21
49	…work in a group		5.42	1.31
*Self-Assertive Efficacy (*B8: *asse)*		.83		
50	…express your opinions when other classmates disagree with you		5.09	1.40
51	…stand up for yourself when you feel that you are being treated unfairly		5.32	1.45
52	…deal with situations where others are annoying you or hurting your feelings		5.03	1.57
53	…stand firm to someone who is asking you to do something unreasonable or inconvenient		5.29	1.34
*Self-Efficacy for Enlisting Parental and Community Support (*B9: *ps)*		.68		
54	…get your parents to help you with a problem		5.21	1.58
55	…get your brothers and sisters to help you with a problem		4.43	1.85
56	…get your parents to take part in school activities		3.40	1.76
57	…get people outside the school to take an interest in your school		3.66	1.66

Self-concept

Self-concept was measured using the eight competence domains (40 items) of the *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988). These assess perceived domain-specific self-concept across a range of academic and non-academic contexts: *Scholastic Competence* and *Social Acceptance*, for example.

The measure employs a 'structured alternative format' designed to discourage socially desirable responses. Respondents are asked to decide which of two statements is most like them (e.g. I feel that I am pretty intelligent / I question whether I am intelligent) and then asked whether this is 'sort of true for me' or 'really true for me'. However, the format has been criticised on the basis that it is time-consuming and the logic is often misunderstood (e.g. Marsh & Holmes, 1990; Wichstrom, 1995). Wichstrom suggests a failure to distinguish between some subscales may be a consequence of adolescents' misunderstanding about how to fill out the measure. In order to allow for more accurate and rapid completion, therefore, the format was modified. Students responded to items in two stages, first choosing one of two opposing statements, as in Harter's original SPPA format, and then identifying whether this is 'always like you' or 'sometimes like you'. Whilst the same structured alternative format still discourages desirable responses, the wording of the second stage is different than Harter's SPPA original; a series of pilot studies indicated that students found this easier to understand. Following piloting of the SPPA, a number of wording changes were made to the items in order to facilitate understanding and take account of cultural differences. Piloting and wording changes are discussed in Appendix A.1. The SPPA competence subscales/items, showing the first statement out of each item pair and reflecting the revised wording, with internal reliabilities and descriptive statistics, are shown in Table 2.8. The full measure as presented to students is shown in Appendix A.3.

Table 2.8 The eight competence subscales of Harter's (1988) *Self-Perception Profile for Adolescents* (showing the first statement out of each item pair), with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the self-perception factor analysis sample (N = 778)

Subscales / items		α	M	SD
*Scholastic Competence (*H1: *schc)*		.76		
1	I feel as if I am just as smart as others my age		2.91	1.13
10	I am pretty slow in finishing my schoolwork		2.74	1.10
19	I do very well at my class work		3.08	0.95
28	I have trouble figuring out the answers in school		2.87	1.06
37	I feel that I am pretty intelligent		2.94	1.12
*Social Acceptance (*H2: *soca)*		.75		
2	I find it hard to make friends		3.49	0.86
11	I have a lot of friends		3.58	0.88
20	I am very hard to like		3.24	0.95
29	I am popular with others my age		3.03	1.07
38	I feel that I am socially accepted by others my age		3.28	0.95
*Athletic Competence (*H3: *athc)*		.89		
3	I do very well at all kinds of sports		2.69	1.17
12	I think I could do well at just about any new athletic activity		2.52	1.18
21	I feel that I am better than others my age at sports		2.25	1.14
30	I don't do very well at new outdoor games		2.61	1.18
39	I do not feel that I am very athletic		2.42	1.22
*Physical Appearance (*H4: *phya)*		.88		
4	I am *not* happy with the way I look		2.79	1.15
13	I wish my body was different		2.58	1.26
22	I wish my physical appearance was different		2.58	1.22
31	I think that I am good looking		2.36	1.14
40	I really like my looks		2.51	1.17
*Job Competence (*H5: *jobc)*		.61		
5	I feel that I am ready to do well at a part-time job		3.40	0.90
14	I feel that I *don't* have enough skills to do well at a part-time job		3.20	0.99
23	I feel that I am old enough to get and keep a part-time paying job		3.38	0.93
32	I feel that I could do better at work I get paid for		2.25	1.21
41	I feel that I am really able to handle the work on a part-time paying job		3.34	0.89
*Romantic Appeal (*H6: *roma)*		.67		
6	I feel that if I fancy someone, that person will like me back		2.19	1.10
15	I am *not* dating the people I am really attracted to		2.90	1.15
24	I feel that people my age will fancy me		2.51	1.09
33	I feel that I am fun and interesting on a date		2.66	1.16
42	I usually *don't* go out with the people I would really like to date		2.78	1.18
*Behavioural Conduct (*H7: *behc)*		.74		
7	I usually do the right thing		3.00	1.03
16	I often get in trouble for the things I do		2.64	1.17
25	I feel really good about the way I often act		2.99	1.01
34	I do things I know I shouldn't do		2.38	1.17
43	I usually act the way I know I'm supposed to		2.96	1.08
*Close Friendship (*H8: *cf)*		.75		
8	I am able to make really close friends		3.42	0.89
17	I do have a really close friend I can share secrets with		3.48	0.95
26	I wish I had a really close friend to share things with		3.46	0.96
35	I find it hard to make friends that I can really trust		3.04	1.13
44	I *don't* have a friend that is close enough to share really personal thoughts with		3.37	1.03

Consistent with the original formulation of the SPPA, responses were scored from 1 to 4 with larger scores indicating higher levels of self-concept[7]. Scores within each subscale are typically added together and averaged to give a final score for each subscale. As can be seen from Table 2.8, using the self-perception factor analysis sample (N = 778), Harter's subscales achieved internal reliabilities ranging from α = .62 (Job Competence) to α = .89 (Athletic Competence).

2.2.4 Data collection procedure

Students were given a pack of pen-and-paper measures to complete. Measures were administered in normal class time during Personal, Health and Social Education (PHSE) lessons, i.e. weekly life skills classes. At the time of data collection, attendance at these classes was compulsory for all Year 10 students in the schools tested. It was therefore anticipated that student attendance would be high and there would be less attrition across times of testing, and so responses would be maximised.

Instructions given at the beginning of the session informed students that there were no right or wrong answers and that their answers would remain confidential. Students were also advised that they were providing information on their feelings about themselves and their schooling, and that participation in the research was voluntary. At this stage, students were given the opportunity to decline to be involved if they so wished.

All items were presented in the order as originally presented by Bandura (1990) and Harter (1988). Counterbalancing of self-efficacy/self-concept measures was utilised to control for shared method bias, with the MSPSE being presented first to half the students and the SPPA being presented first to the other half. Trial items were provided at the beginning of the session. The self-esteem measure used in this thesis was the Global Self-Worth subscale of the SPPA (this is discussed in more detail in Chapter 3). Therefore, consistent with the original presentation of the SPPA, the self-esteem items were interspersed with the self-concept items. The other measures used in the thesis (intrinsic motivation, educational and occupational aspirations, and intervention process questions) were presented in this order after the self-efficacy and self-concept measures. The sample included a number of students with special educational needs. In instances where these or

[7] Of the two opposing statements, the most positive statement combined with an 'always like you' response = 4; most positive statement/sometimes like you = 3; least positive statement/sometimes like you = 2; least positive statement/always like you = 1.

other students experienced reading difficulties they were assisted by the researcher or the teacher.

2.2.5 Data preparation, cleaning and screening procedures

All data provided by students (psychometric and aspiration data, and intervention process responses) were entered into SPSS. The accuracy of the data inputting and the presence of out-of-range responses were assessed by examining descriptive statistics of the variables. Where student responses were ambiguous or out-of-range, the original hard copy responses were consulted to determine the correct value/response and corrections were subsequently made to the data file. Where it was not possible to determine the correct response an item was recorded as missing.

Prior to any analyses all the psychometric variables were screened for normality. Variables in the full sample (with missing data) and the self-perception factor analysis sample were screened separately for skewness and kurtosis. It is argued that for large samples (above 200), variables with statistically significant skewness and kurtosis do not often deviate enough from normality to make a substantive difference to the analysis (Tabachnick & Fidell, 2001). Therefore, the actual size of the skewness/kurtosis value (worse the further from zero) and the visual appearance of the distribution are more important. Taking this into consideration, because the samples used here were large, the deviation of skewness/kurtosis values from zero, and whether or not the variables appeared normally distributed, were taken as indicators of normality. Examination of frequency histograms indicated that a few of the variables were slightly negatively skewed (within the full sample and the factor analysis sample). Examination of the skewness/kurtosis values revealed a few values greater than 1.0. However, none were greater than 3.0 and the majority were under 1.5. Where the skewness values were greater than 1.0, or where frequency histograms appeared the most skewed, normal probability plots were run as an extra check on the appearance of the data. These indicated that that all the variables were relatively normally distributed, therefore it was not considered necessary to conduct any transformations prior to the main analyses.

2.2.6 Overview of thesis design and analysis

Table 2.9 gives an overview of the overall thesis design, summarises the types of analyses that are to be conducted in each empirical chapter of the thesis, and outlines the samples, procedures for dealing with missing data, and measures to be used for each set of analyses.

Table 2.9 Overview of thesis design and analyses

Basic design	
• 10 schools – five intervention, five control. • Data collected at three time points – baseline (pre-intervention), post-test, and follow-up. • Testing dates varied across schools and were dependent on when intervention schools administered the intervention. • Testing dates for each control school were closely matched to its respective intervention school. • At each time of testing students were given a booklet which included the three self-perception measures, the motivation measure and the aspiration measure. Name and gender was also collected. • Intervention students were also given an intervention process measure at post-test and follow-up. • Prior academic performance (KS3), subsequent academic performance (GCSE), socio-economic status (ACORN score, FSM) and SEN indicators were obtained from the LEA.	
Chapter 2 – Factor analyses	
Sample	• Intervention students – baseline data if complete. • Control students – baseline data if complete, post-test data if baseline not complete, follow-up data if post-test not complete.
Dealing with missing data	Listwise deletion – students' data included only if it had no missing responses.
Measures included	• All nine subscales of the MSPSE. • The eight self-concept subscales of the SPPA.
Analysis	• Individual factor analyses of the MSPSE and SPPA (first-order and second-order) to examine the validity and reliability of the factor structures. • Aggregate factor analysis of the MSPSE and SPPA to determine whether self-efficacy and self-concept are distinct constructs.
Chapter 3 – Regression analyses	
Sample	Self-perception factor analysis sample – a cross-sectional dataset.
Measures included	• Self-esteem. • Eleven different self-concept/self-efficacy structures (these included the original MSPSE and SPPA, the six structures derived from the Chapter 2 factor analyses, and three other measures which combined self-efficacy/self-concept structures). All subscales were included. • Motivation – three subscales. • Aspirations – educational and occupational. • Prior and subsequent academic performance (KS3, GCSE). • Socio-economic status (ACORN, FSM), SEN and gender. A summary of the self-perception structures used is presented in Section 3.2.5: Table 3.6.
Analysis	• A series of regression analyses that examine the extent to which different self-perception constructs and structures predict academic functioning (academic performance, motivation, aspirations). • Analyses controlled for prior academic performance, socio-economic status, SEN and gender. An overview of the regression models is presented in Section 3.2.5: Table 3.7.

Table continued over the page…

Table 2.9 continued…

Chapter 4 – Intervention analyses	
Sample	• Data from all three times of testing – a longitudinal dataset. • Included if students had provided at least one response within each subscale for each of the self-perception and motivation measures at each time of testing.
Dealing with missing data	• Personal mean substitution for self-perception and motivation data, i.e. the mean of responses given for a specific subscale was used to impute the rest of the responses within that subscale. • Listwise deletion for all other data.
Measures included	• Self-esteem. • Self-efficacy – MSPSE (all nine subscales). • Self-concept – SPPA (all eight subscales). • Self-competence – two measures – first-order, second-order (all subscales in each). • Motivation – three subscales. • Aspirations – educational and occupational. • Prior and subsequent performance (KS3 and GCSE). • Socio-economic status (ACORN, FSM), SEN and gender.
Analysis	• A series of ANOVAs designed to examine whether self-perceptions can be enhanced and if so, whether any increase is associated with improved academic functioning. • Analyses controlled for prior academic performance, socio-economic status, SEN and gender.

Note: KS3–Key Stage 3 SATs; ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator; FSM–Free school meals; SEN–Special educational needs; LEA–Local Education Authority; MSPSE–*Multidimensional Scales of Perceived Self-Efficacy* (Bandura, 1990); SPPA–*Self-Perception Profile for Adolescents* (Harter, 1988).

2.3 Results: Self-Perception Factor Analysis

First- and second-order factor analyses (using principal factors analysis; PFA) were performed using SPSS. Initially, first- and second-order factor analyses were run on the MSPSE self-efficacy and SPPA self-concept measures individually. Then all the MSPSE and SPPA items were entered into an aggregate factor analysis to determine whether self-efficacy and self-concept are distinct. In order that MSPSE/SPPA items contributed equal weight to the total, prior to the factor analyses MSPSE scores were multiplied by four and SPPA scores were multiplied by seven, giving a score out of 28 to be used for subsequent calculations. Because some relationship is expected amongst self-perception variables, and they are therefore expected to intercorrelate with other items in their corresponding scale (Bandura, 1997; Harter, 1988), an oblique (direct oblimin) rotation with Kaiser Normalisation (Kaiser, 1958) was used for the analyses (delta = 0). Parallel analysis (Thompson & Daniel, 1996; Wilson & Cooper, 2008) was used to determine the number of factors to be extracted. Parallel analysis calculations were undertaken using syntax provided by O'Connor (2000), i.e. 'rawpar.sps' syntax for permutations of the raw data set using principal factors with 1000 data sets and a criterion of 95%. Consistent with previous factor analyses conducted on the MSPSE and SPPA, a criterion of .30 was used for interpretation of the factor loadings[8]. Preliminary analyses indicated suitability of the self-efficacy, the self-concept, and the aggregate self-efficacy/self-concept data sets for factor analysis. For all first- and second-order analyses the initial Kaiser-Meyer-Olkin values (Kaiser, 1974) were well over the recommended value of .6; Bartlett's (1954) Test of Sphericity reached significance; and the presence of many coefficients over .30 in the correlation matrices supported factorability[9].

2.3.1 Self-efficacy

Self-efficacy: First-order factor analysis

Principal factors analysis using all 57 MSPSE self-efficacy items extracted 11 factors with pre-rotational eigenvalues above 1.0, accounting for 60.84% of the variance[10]. Examination of the rotated pattern matrix revealed seven items (1, 2, 4, 10, 41, 46, 47) that did not load onto any factor in the matrix. In addition, three factors contained only two or three items. Parallel analysis (O'Connor, 2000) using all 57 items revealed seven factors with eigenvalues greater than those that might be expected to occur by chance, i.e. eigenvalues for the real data exceeded the eigenvalues for the randomly generated data in the first seven cases. This suggests that seven factors would provide a more interpretable solution. Examination of the scree plot also indicated a break at seven. An additional factor analysis was therefore undertaken, constraining the factors to seven and dropping the seven items that did not relate in the initial analysis. The rotated pattern matrix, percentages of variance explained (which accounted for 55.22% in total), and reliabilities are shown in Table 2.10[11].

---

[8] The factor structures were also examined using a .40 cut-off criterion. However, the .30 criterion was retained as it was thought important to keep this consistent with previous factor analyses undertaken on the MSPSE and the SPPA.

[9] *Self-efficacy factor analysis*: Kaiser-Meyer-Olkin values: first-order = .94; second-order = .88; Bartlett's Test of Sphericity: first-order: $\chi^2 = 22566.27$, df = 1596, $p < .001$; second-order: $\chi^2 = 1876.78$, df = 21, $p < .001$. *Self-concept factor analysis*: Kaiser-Meyer-Olkin values: first-order = .88; second-order = .93; Bartlett's Test of Sphericity: first-order: $\chi^2 = 11671.49$, df = 780, $p < .001$; second-order: $\chi^2 = 951.11$, df = 28, $p < .001$. *Aggregate self-efficacy/self-concept factor analysis*: Kaiser-Meyer-Olkin values: first-order = .94; second-order = .93; Bartlett's Test of Sphericity: first-order: $\chi^2 = 38119.17$, df = 4656, $p < .001$; second-order: $\chi^2 = 2178.47$, df = 45, $p < .001$.

[10] The proportion of variance assigned to individual factors is to some extent ambiguous. This is because in oblique rotations factors are correlated and share overlapping variability (Tabachnick & Fidell, 2001).

[11] Note that two additional first-order factor structures were inspected – a six-factor structure and an eight-factor structure. Both of these provided a less theoretically meaningful interpretation than did the seven-factor solution, therefore the seven-factor solution was retained.

Table 2.10 Self-efficacy: First-order rotated pattern coefficients

Item number	MSPSE subscales	First-order pattern matrix						
		SF1	SF2	SF3	SF4	SF5	SF6	SF7
15	sregl	*.53*	.04	.03	.06	.08	.20	.04
14	sregl	*.49*	.20	.03	.00	.03	.14	.12
23	sregl	*.47*	.14	.05	.12	.00	.21	.14
16	sregl	*.45*	.15	.07	.07	.05	.16	.18
20	sregl	*.43*	.10	.12	.05	.06	.19	.21
17	sregl	*.42*	-.00	.15	-.00	.12	.19	.16
19	sregl	*.42*	.11	.09	.04	.11	.19	.22
22	sregl	*.39*	.12	.14	.00	-.01	.19	.13
21	sregl	*.37*	.07	.12	.10	.07	.05	*.34**
37	srege	-.03	*.83*	.02	.03	-.05	-.02	-.04
35	srege	.09	*.69*	.00	.11	-.06	-.08	.04
36	srege	.25	*.67*	-.05	.03	.05	-.04	-.11
39	srege	*-.46**	*.66*	.08	-.01	.02	.10	.09
38	srege	*-.42**	*.66*	.05	-.00	-.00	.13	.07
40	srege	.08	*.64*	-.04	-.10	.10	-.01	-.06
33	srege	.22	*.44*	.17	.05	.04	-.02	.04
34	srege	.15	*.42*	-.01	.09	.00	.04	.14
51	asse	-.08	-.03	*.81*	.03	-.09	-.01	.01
53	asse	.01	.09	*.72*	-.04	-.09	.06	.06
50	asse	-.03	-.06	*.72*	-.03	.11	-.03	.08
52	asse	.07	.05	*.67*	.01	-.12	.08	-.08
49	soce	.03	.01	*.60*	.14	.15	.04	-.08
48	soce	-.01	.00	*.57*	.09	.16	.03	-.04
24	sregl	.03	-.12	*.40*	.16	.21	-.06	.20
25	exa	.01	-.04	.03	*.86*	-.02	-.02	-.06
32	exa	-.06	.03	-.01	*.85*	.02	.04	-.02
31	exa	-.07	.04	-.03	*.82*	.04	-.01	.10
30	exa	.01	-.02	-.03	.09	*.67*	-.02	.01
26	exa	-.09	.03	.03	.05	*.62*	.14	-.22
27	exa	-.12	-.02	.03	.03	*.58*	.04	.02
28	exa	.14	.02	-.01	.03	*.58*	-.01	.07
29	exa	.20	.09	.06	.08	*.41*	-.02	.17
12	aca	.03	.01	.27	-.08	*.37*	-.01	*.32**
13	aca	.18	.09	.23	-.02	*.31*	.03	.22
54	ps	-.07	.01	.04	-.00	-.04	*.74*	.02
3	socr	.05	-.11	.06	.02	.03	*.54*	.00
55	ps	.01	-.04	.07	.06	.05	*.46*	-.12
42	othe	.05	.21	-.07	.06	-.04	*.46*	*.30**
56	ps	.09	.01	-.03	.03	.11	*.41*	.03
44	othe	.01	.12	.01	.07	.04	*.33*	*.31**
57	ps	.20	-.05	.11	.11	*.32**	*.32*	-.08
7	aca	-.01	-.03	-.02	.08	-.04	.09	*.70*
8	aca	.00	.02	.01	.02	.06	-.01	*.70*
5	aca	.06	-.04	.12	.20	-.05	-.00	*.48*
6	aca	.08	-.01	.11	.12	.05	-.03	*.46*
43	othe	.18	.26	-.02	.04	.02	.29	*.31*
% variance explained		28.86	7.19	5.42	3.94	3.71	3.39	2.71
Reliabilities (Cronbach's)		.92	.84	.86	.88	.80	.76	.78

Note: Item numbers are as the original *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990). Subscale codes relate to the original MSPSE subscales: sregl–Self-Regulated Learning; srege–Self-Regulatory Efficacy; asse–Self-Assertive Efficacy; soce–Social Self-Efficacy; exa–Leisure-Time Skills & Extracurricular Activities; aca–Academic Achievement; ps–Enlisting Parental & Community Support; socr–Enlisting Social Resources; othe–Meet Others' Expectations.
SF1–Self-Efficacy for Self-Regulated Learning; SF2–Self-Regulatory Efficacy for Good Conduct; SF3–Self-Assertive Efficacy; SF4–Sports Self-Efficacy; SF5–Communication/Performing Arts Self-Efficacy; SF6–Social Self-Regulatory Efficacy; SF7–Mathematics/Science Self-Efficacy.
Factor coefficients ≥ .30 are italicised.
*Indicates cross-factor loadings; these are not included in factor interpretations or reliability calculations.

Of the 50 items in the analysis, four (9, 11, 18, 45) did not load onto any factor and have not been interpreted as part of the factor structure. None of the factors correspond exactly to any of the MSPSE subscales although there are some similarities. The resulting factors were named and are listed in Table 2.11, together with the items that represent each factor. As can be seen in the table, two of these factors (Self-Efficacy for Self-Regulated Learning and Self-Regulatory Efficacy for Good Conduct) are very similar to those specified by Bandura. Another factor (Self-Assertive Efficacy) was given the same interpretation as that proposed by Bandura, although it included additional items. The remaining four factors were different to those presented by Bandura and were given a different interpretation.

In cases where factors were similar to the original subscales the same factor names were used. The exception to this was Self-Regulatory Efficacy for Good Conduct. This factor assesses ability to avoid engaging in behaviours such as getting into trouble or taking drugs and is consistent with one proposed by Bandura, and also demonstrated by Choi et al. (2001) and Miller et al. (1999). Bandura's terminology suggests that this is a general self-regulation construct. However, the present findings suggest that the narrower description is more appropriate.

Of the other factors, four are specifically worth discussing. *Factor SF1* (Self-Assertive Efficacy) includes three items that reflect carrying on conversations with others, working in a group, and joining in class discussions. As these all represent assertive behaviours the original name for this factor has been retained. *Factor SF5* has been interpreted as a Communication/Performing Arts factor as some of the items within this factor (12, 13, 28, 29) can be classed as communication disciplines. *Factor SF6* has been interpreted as a Social Self-Regulatory factor as the items appear to be about regulating the self in a social context as opposed to on a personal level (good conduct), or an academic level (self-regulated learning). It assesses self-efficacy for enlisting support/meeting expectations and includes items taken from three of the MSPSE subscales. Miller et al. (1999) showed a similar factor. *Factor SF7* (Mathematics/Science Self-Efficacy) reflects ability to learn mathematics and science disciplines. The factor also contains another item that reflects living up to teachers' expectations. The fit of this last item is unclear but perhaps reflects self-efficacy to achieve teachers' expectations in mathematics and science disciplines.

Table 2.11 First-order self-efficacy factors showing the items they are composed of and which original MSPSE subscale the items originated from

Factor name	MSPSE subscale	Item no.	Item (all items are prefixed with 'How well can you…?')
SF1. Self-Efficacy for Self-Regulated Learning	Self-Efficacy for Self-Regulated Learning	14	…finish your homework assignment by deadlines
		15	…study when there are other interesting things to do
		16	…concentrate on school subjects
		17	…take notes in class
		19	…plan your schoolwork
		20	…organise your schoolwork
		21	…remember information that is presented in class and in textbooks
		22	…arrange a place to study without distractions
		23	…motivate yourself to do schoolwork
SF2. Self-Regulatory Efficacy for Good Conduct	Self-Regulatory Efficacy	33	…resist peer pressure to do things in school that can get you into trouble
		34	…stop yourself from skipping school when you feel bored or upset
		35	…resist peer pressure to smoke cigarettes
		36	…resist peer pressure to drink alcohol
		37	…resist peer pressure to smoke marijuana (cannabis, pot, weed, draw)
		38	…resist peer pressure to take ecstasy
		39	…resist peer pressure to use crack (cocaine)
		40	…resist peer pressure to have sexual intercourse
SF3. Self-Assertive Efficacy	Self-Assertive Efficacy	50	…express your opinions when other classmates disagree with you
		51	…stand up for yourself when you feel that you are being treated unfairly
		52	…deal with situations where others are annoying you or hurting your feelings
		53	…stand firm to someone who is asking you to do something unreasonable or inconvenient
	Social Self-Efficacy	48	…carry on conversations with others
		49	…work in a group
	Self-Regulated Learning	24	…join in class discussion
SF4. Sports Self-Efficacy	Leisure-Time Skills & Extracurricular Activities	25	…learn sports skills
		31	…do regular physical education activities
		32	…learn the things needed for team sports (for example, football, netball, basketball, volleyball, swimming)
SF5. Communication / Performing Arts Self-Efficacy	Leisure-Time Skills & Extracurricular Activities	26	…learn dance skills
		27	…learn music skills
		28	…do the kinds of things needed to be a member of the school newspaper
		29	…do the things needed to be a member of the school government
		30	…do the kinds of things needed to take part in school plays
	Academic Achievement	12	…learn social studies
		13	…learn English grammar
SF6. Social Self-Regulatory Efficacy	Enlisting Social Resources	3	…get adults to help you when you have social problems
	Meet Others' Expectations	42	…live up to what your parents expect of you
		44	…live up to what your peers expect of you
	Enlisting Parental & Community Support	54	…get your parents to help you with a problem
		55	…get your brother(s) and sister(s) to help you with a problem
		56	…get your parents to take part in school activities
		57	…get people outside the school to take an interest in your school
SF7. Mathematics / Science Self-Efficacy	Academic Achievement	5	…learn general mathematics
		6	…learn algebra
		7	…learn science
		8	…learn biology
	Meet Others' Expectations	43	…live up to what your teachers expect of you

Note: Item numbers are as the original *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990).

Self-efficacy: Second-order factor analysis

To test whether the pattern of second-order factors obtained by Miller et al. (1999) and Choi et al. (2001) would replicate with the current data, a second-order factor analysis was conducted using first-order factor scores; computed by taking the mean response for items that identify a given factor (e.g., Items 25, 31 and 32 for *Factor SF4*). The initial PFA extracted one factor with eigenvalues above 1.0, which explained 51.13% of the variance in total. However, the scree plot and parallel analysis performed on the seven first-order factors (using PFA syntax; O'Connor, 2000) indicated that two factors would be a more appropriate solution and an additional second-order factor analysis was undertaken, constraining the factors to two[12]. This explained 64.35% of the variance in total. The rotated pattern matrix is presented in Table 2.12. As can be seen, these results suggest that there are two global factors at the higher level corresponding to academic/self-management and social activities. Their characteristics are listed below. These results are different to Choi et al. (2001) and Miller et al. (1999) who treated the MSPSE as measuring three second-order constructs: Social Self-Efficacy, Academic Self-Efficacy and Task-Management Self-Efficacy.

secSF1. *Academic and Self-Management Efficacy*: Composed of four first-order factors: Self-Efficacy for Self-Regulated Learning; Mathematics/Science Self-Efficacy; Self-Regulatory Efficacy for Good Conduct; and Social Self-Regulatory Efficacy. This factor is similar to that named 'Task Management Efficacy' by Miller et al. (1999) and Choi et al. (2001) but in contrast to these authors, this factor includes mathematics and science self-efficacy items. Miller et al.'s version of the social self-regulatory factor also loaded with self-regulated learning and good conduct items at the second-order level.

secSF2. *Social Self-Efficacy*: Composed of three first-order factors: Self-Assertive Efficacy; Sports Self-Efficacy; and Communication/Performing Arts Self-Efficacy. This factor parallels the factor of the same name proposed by Miller et al. and Choi et al. In contrast to Choi and his colleagues, however, this factor includes sports items.

[12] Note that a three-factor second-order structure was also inspected. This provided a less theoretically meaningful interpretation than the two-factor solution, with a number of cross-factor loadings and a one-item factor. Therefore the two-factor solution was retained.

Table 2.12 Self-efficacy: Second-order rotated pattern coefficients

First-order self-efficacy factors	Second-order pattern matrix	
	secSF1. Academic & Self-Management Efficacy	secSF2. Social Self-Efficacy
Self-Regulated Learning (SF1)	*.79*	.11
Mathematics/Science Self-Efficacy (SF7)	*.59*	.23
Self-Regulatory Efficacy for Good Conduct (SF2)	*.58*	-.09
Social Self-Regulatory Efficacy (SF6)	*.47*	*.32**
Self-Assertive Efficacy (SF3)	-.02	*.76*
Sports Self-Efficacy (SF4)	.01	*.56*
Communication/Performing Arts (SF5)	*.31**	*.43*
% variance explained	51.13	13.22
Reliabilities (Cronbach's)	.79	.66

Note: Factor coefficients ≥ .30 are italicised.
*Indicates cross-factor loadings; these are not included in factor interpretations or reliability calculations.

As can be seen from Table 2.12, there is evidence of cross-factor loadings in the second-order structure; Social Self-Regulation items are weakly correlated with Social Self-Efficacy, and Communication/Performing Arts items are weakly correlated with Academic/Self-Management Efficacy.

Table 2.13 shows the pattern of correlations between first- and second-order self-efficacy factors. If there is a hierarchical structure underlying the data then we would expect high positive relationships between a second-order factor and the first-order factors it is composed of, but low correlations with those it is not composed of (Byrne, 1996). As can be seen in Table 2.13, the pattern of correlations is clearly compatible with a hierarchical structure. The possible implications of this hierarchical structure are explored in the Discussion section of this chapter.

Table 2.13 Self-efficacy: Correlations between first- and second-order factors

First-order self-efficacy factors	Second-order self-efficacy factors	
	secSF1. Academic & Self-Management Efficacy	secSF2. Social Self-Efficacy
Self-Regulated Learning (SF1)	.85**	.56**
Mathematics/Science Self-Efficacy (SF7)	.81**	.55**
Self-Regulatory Efficacy for Good Conduct (SF2)	.70**	.26**
Social Self-Regulatory Efficacy (SF6)	.78**	.54**
Self-Assertive Efficacy (SF3)	.49**	.77**
Sports Self-Efficacy (SF4)	.39**	.82**
Communication/Performing Arts (SF5)	.57**	.74**

**Correlation is significant at $p < .01$ (two-tailed).

Summary of self-efficacy factor analyses

Taken together, these findings demonstrate that the structure of self-efficacy is multidimensional. It was not possible to completely replicate the first-order structure as proposed by Bandura (1990), however. These findings also demonstrate that the structure of self-efficacy is hierarchical, but show that it is represented by two underlying domains, rather than the three-factor domain structure proposed by Choi et al. (2001) and Miller et al. (1999).

2.3.2 Self-concept

Self-concept: First-order factor analysis

Principal factors analysis using all 40 SPPA self-concept items extracted nine factors with pre-rotational eigenvalues greater than 1.0, accounting for 59.58% of the variance in total. Examination of the rotated pattern matrix revealed three items (6, 25, 32) that did not load on any factor, whilst an additional two factors contained only two items. Parallel analysis (O'Connor, 2000) using all 40 items revealed eight factors with eigenvalues greater than what might be expected to occur by chance, i.e. eigenvalues for the real data exceeded the eigenvalues for the randomly generated data in the first eight cases. Examination of the scree plots also indicated a break at eight. Taken together, this suggests that eight factors might produce a more interpretable solution. This number is consistent with Harter's (1988) original SPPA factor pattern. An additional factor analysis was therefore conducted, constraining the number of factors to eight and excluding the three items that did not load in the initial analysis. The rotated pattern matrix, percentages of variance explained, and reliabilities are presented in Table 2.14. The eight factors accounted for 59.20% of the variance in total[13].

[13] Note that two additional first-order factor structures were inspected – a seven-factor structure and a nine-factor structure. Both of these provided a less theoretically meaningful interpretation than did the eight-factor solution, therefore the eight-factor solution was retained.

Table 2.14 Self-concept: First-order rotated pattern coefficients

Item number	SPPA subscales	First-order pattern matrix							
		SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8
40	phya	*.83*	-.05	.04	.02	-.05	-.02	-.00	.05
13	phya	*.78*	.07	.03	.05	.03	.12	-.00	.02
22	phya	*.78*	.08	.06	.08	-.01	.08	.01	.06
4	phya	*.75*	.05	.10	-.02	.03	-.03	-.00	-.04
31	phya	*.68*	-.07	-.07	.01	.01	-.14	.04	-.06
24	roma	*.38*	-.16	-.10	.08	-.06	-.20	.14	-.13
26	cf	.02	*.76*	-.03	-.02	.00	-.01	-.02	.01
44	cf	.02	*.72*	-.09	-.01	-.03	.02	.09	-.07
17	cf	.00	*.57*	.04	-.00	-.01	-.11	-.04	.03
35	cf	.04	*.36*	.06	.02	.04	-.31	.14	-.07
34	behc	.00	.07	*.70*	.05	.01	.14	-.03	.01
16	behc	.02	.01	*.69*	-.08	.06	.02	-.00	-.09
43	behc	.11	-.09	*.61*	-.02	-.02	-.08	.00	-.02
7	behc	.00	-.05	*.48*	.02	-.04	-.06	-.05	-.22
3	athc	-.02	-.02	.02	*.85*	-.04	-.09	-.03	.09
39	athc	.02	.08	.01	*.82*	.02	.10	.05	.02
12	athc	.06	-.05	-.03	*.78*	.01	.02	-.01	-.06
21	athc	.01	-.08	-.03	*.74*	.04	-.03	-.01	-.04
30	athc	.00	.03	.01	*.67*	-.03	-.05	-.02	-.01
23	jobc	-.06	-.07	.02	.01	*-.76*	-.01	.01	.04
5	jobc	-.03	.04	-.02	.00	*-.71*	-.00	-.06	.06
41	jobc	.05	-.03	-.03	-.05	*-.65*	-.01	.06	-.05
14	jobc	.07	.13	.02	.05	*-.40*	.04	.02	-.19
11	soca	-.01	.06	-.06	.03	-.03	*-.65*	-.06	-.02
29	soca	.04	-.05	-.13	.13	.01	*-.60*	-.00	-.09
38	soca	.10	.01	.05	.07	-.07	*-.58*	-.01	-.02
2	soca	-.02	.12	-.06	.06	.03	*-.51*	.07	-.08
8	cf	-.01	.19	.04	-.04	-.02	*-.47*	.04	-.04
20	soca	-.00	.00	.23	.02	-.06	*-.40*	.19	.07
42	roma	.05	.03	-.04	-.01	-.02	.07	*.77*	.03
15	roma	-.01	-.01	-.02	.01	.01	-.02	*.61*	-.00
37	schc	.15	-.01	-.05	-.04	-.06	-.06	-.03	*-.64*
1	schc	.07	-.01	-.02	.01	.02	-.06	-.07	*-.63*
28	schc	-.10	.06	.09	.06	-.05	.05	.02	*-.61*
19	schc	.02	.04	.20	-.01	-.03	-.03	.01	*-.55*
10	schc	-.11	.00	.10	.06	-.03	.02	.11	*-.46*
% variance explained		20.22	9.16	7.78	5.94	5.26	3.78	3.64	3.44
Reliabilities (Cronbach's)		.88	.75	.75	.89	.73	.77	.67	.76

Note: Item numbers are as the original *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988). Subscale codes relate to the original subscales: phya–Physical Appearance, roma–Romantic Appeal, cf–Close Friendship, behc–Behavioural Conduct, athc–Athletic Competence, jobc–Job Competence, soca–Social Acceptance, schc–Scholastic Competence.
SC1–Physical Appearance Self-Concept; SC2–Close Friendship Self-Concept; SC3–Behavioural Conduct Self-Concept; SC4–Athletic Self-Concept; SC5–Job Self-Concept; SC6–Social Acceptance Self-Concept; SC7–Romantic Appeal Self-Concept; SC8–Scholastic Self-Concept.
Factor coefficients ≥ .30 are italicised.

Thirty-six of the 37 items have been interpreted into the factor structure (Item 33 failed to load and has not been interpreted). The factors were named and are listed in Table 2.15. Where factors were the same or similar to the original subscales, the same factor names were used. One point to note is that Harter uses the term 'competence' in naming her factors. For example, referring to *Job Competence*, rather than *Job Self-Concept*. However, this thesis utilises the term 'self-concept' to avoid confusion with later named factors (this is discussed in more detail in the aggregate factor analysis section).

Table 2.15 First-order self-concept factors showing the items they are composed of and which original SPPA subscale the items originated from

Factor name	SPPA subscale	Item no.	Item
SC1. Physical Appearance Self-Concept	Physical Appearance	4	I am *not* happy with the way I look
		13	I wish my body was different
		22	I wish my physical appearance was different
		31	I think that I am good looking
		40	I really like my looks
	Romantic Appeal	24	I feel that people my age will fancy me
SC2. Close Friendship Self-Concept	Close Friendship	17	I do have a really close friend I can share secrets with
		26	I wish I had a really close friend to share things with
		35	I find it hard to make friends that I can really trust
		44	I *don't* have a friend that is close enough to share really personal thoughts with
SC3. Behavioural Conduct Self-Concept	Behavioural Conduct	7	I usually do the right thing
		16	I often get in trouble for the things I do
		34	I do things I know I shouldn't do
		43	I usually act the way I know I'm supposed to
SC4. Athletic Self-Concept	Athletic Competence	3	I do very well at all kinds of sports
		12	I think I could do well at just about any new athletic activity
		21	I feel that I am better than others my age at sports
		30	I don't do very well at new outdoor games
		39	I do not feel that I am very athletic
SC5. Job Self-Concept	Job Competence	5	I feel that I am ready to do well at a part-time job
		14	I feel that I *don't* have enough skills to do well at a part-time job
		23	I feel that I am old enough to get and keep a part-time paying job
		41	I feel that I am really able to handle the work on a part-time paying job
SC6. Social Acceptance Self-Concept	Social Acceptance	2	I find it hard to make friends
		11	I have a lot of friends
		20	I am very hard to like
		29	I am popular with others my age
		38	I feel that I am socially accepted by others my age
	Close Friendship	9	I am able to make really close friends
SC7. Romantic Appeal Self-Concept	Romantic Appeal	15	I am *not* dating the people I am really attracted to
		42	I usually *don't* go out with the people that I would really like to date
SC8. Scholastic Self-Concept	Scholastic Competence	1	I feel as if I am just as smart as others my age
		10	I am pretty slow in finishing my schoolwork
		19	I do very well at my class work
		28	I have trouble figuring out the answers in school
		37	I feel that I am pretty intelligent

Note: Item numbers are as the original *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988).

As can be seen in Table 2.15, two of the eight factors map exactly on to the SPPA subscales (i.e. Athletic Self-Concept and Scholastic Self-Concept), whilst five others are similar but not identical. Of these five, *Factor SC6* (Social Acceptance Self-Concept) should be noted particularly. This factor combines the original five SPPA Social Acceptance items with one Close Friendship item (Item 8: able to make really close friends). As some of the Social Acceptance items are about making friends this Item 8 fits in well here.

Self-concept: Second-order factor analysis

In order to examine the hierarchical nature of self-concept as represented by the SPPA, a second-order factor analysis was conducted using first-order factor scores; computed by taking the mean response for items that identified a given factor. The initial PFA extracted three factors with eigenvalues above 1.0. The scree plot and parallel analysis performed on the eight first-order factors (using PFA syntax; O'Connor, 2000) confirmed that a three-factor solution would provide the most appropriate interpretation. These factors explained 60.48% of the total variance[14]. The results, taken from the rotated pattern matrix, are presented in Table 2.16. As the table shows, this second-order structure does not include first-order *Factor SC5* (Job Self-Concept) which failed to load onto any factor in the matrix. The three factors are Physical Self-Concept, Scholastic and Behavioural Self-Concept, and Social Self-Concept. Their characteristics are:

secSC1. *Physical Self-Concept*: Composed of two first-order factors: Athletic Self-Concept and Physical Appearance Self-Concept.

secSC2. *Scholastic and Behavioural Self-Concept*: Composed of two first-order factors: Scholastic Self-Concept and Behavioural Conduct Self-Concept.

secSC3. *Social Self-Concept*: Composed of three first-order self-concept factors: Close Friendship; Social Acceptance; and Romantic Appeal.

The pattern of correlations between first- and second-order self-concept factors (Table 2.17) indicates that the structure of the data is hierarchical. The possible implications of this hierarchical structure are explored in the Discussion section of this chapter.

[14] Note that a two-factor structure was also inspected. This provided a less theoretically meaningful interpretation than did the three-factor solution. Therefore the three-factor solution was retained.

Table 2.16 Self-concept: Second-order rotated pattern coefficients

First-order self-concept factors	Second-order self-concept factors		
	secSC1. Physical Self-Concept	**secSC2. Scholastic & Behavioural Self-Concept**	**secSC3. Social Self-Concept**
Athletic Self-Concept (SC4)	*.76*	-.03	-.05
Physical Appearance (SC1)	*.56*	.11	.05
Scholastic Self-Concept (SC8)	.12	*.82*	.08
Behavioural Conduct (SC3)	-.04	*.50*	-.07
Close Friendship (SC2)	-.17	.04	*.70*
Social Acceptance (SC6)	.27	.03	*.59*
Romantic Appeal (SC7)	.17	-.05	*.33*
% variance explained	31.37	15.57	13.59
Reliabilities (Cronbach's)	.60	.56	.54

Note: Factor coefficients ≥ .30 are italicised.

Table 2.17 Self-concept: Correlations between first- and second-order factors

First-order self-concept factors	Second-order self-concept factors		
	secSC1. Physical Self-Concept	**secSC2. Scholastic & Behavioural Self-Concept**	**secSC3. Social Self-Concept**
Athletic Self-Concept (SC4)	.85**	.13**	.25**
Physical Appearance (SC1)	.84**	.24**	.30**
Scholastic Self-Concept (SC8)	.30**	.82**	.29**
Behavioural Conduct (SC3)	.07**	.85**	.03**
Close Friendship (SC2)	.10**	.16**	.72**
Social Acceptance (SC6)	.42**	.22**	.71**
Romantic Appeal (SC7)	.24**	.06**	.77**

**Correlation is significant at $p < .01$ (two-tailed).

Summary of self-concept factor analyses

Taken together, these findings demonstrate that the structure of self-concept is multidimensional. Although it was not possible to completely replicate the first-order structure as proposed by Harter (1988), the structure presented here is very similar. These findings also demonstrate that the structure of self-concept is hierarchical, and show that it is represented by three underlying domains. These findings are consistent with previous research (e.g. Marsh & Shavelson, 1985; Yeung et al., 2000) that has evidenced a number of different levels to self-concept hierarchy, but do not support Harter (1990a), who has questioned whether self-concept is hierarchical.

2.3.3 Construct validity

Construct validity refers to the way that scores on factors covary. This section therefore explores whether the factors derived from the individual self-efficacy/self-concept factor analyses correlate with one another, and with factors on the opposite measure, in predictable ways. This provides some indication that the MSPSE and SPPA do measure what Bandura and Harter claim they measure. It also provides some indication about whether the measures are distinct – high correlations between self-concept/self-efficacy factors would indicate that the instruments are measuring the same underlying construct. Table 2.18 shows the bivariate correlations between self-efficacy and self-concept first-order factor scores.

Examination of Table 2.18 reveals that the correlations between self-concept factors are all low. Correlations between self-efficacy factors are also mainly in the low to mid range, with two exceptions: between Self-Efficacy for Self-Regulated Learning (SF1) and Self-Efficacy for Enlisting Support (SF6) (.61), and between Self-Efficacy for Self-Regulated Learning (SF1) and Mathematics/Science Self-Efficacy (SF7) (.66). This suggests that the items within each pair of factors may be measuring the same aspect of self-efficacy.

The correlations between self-efficacy and self-concept factors are sufficiently weak in most cases to suggest that the psychological constructs that underlie the MSPSE measure are not the same as those measured by the SPPA. However, there is one exception: a strong positive relationship (.74) between Sports Self-Efficacy (SF4) and Athletic Self-Concept (SC4). This suggests that these subscales measure the same underlying construct. Three other first-order self-efficacy/self-concept correlations (SF1/SC8; SF3/SC6; SF7/SC8) were at a level (slightly over .50) that would suggest some overlap in dimensions.

The findings also suggest some overlap in second-order dimensions: between Academic/Self-Management Self-Efficacy (secSF1) and Scholastic/Behavioural Self-Concept (secSC2) (.64), and between Social Self-Efficacy (secSF2) and Physical Self-Concept (secSC1) (.56). These results justify conducting an ‘aggregate’ factor analysis (one containing *all* the MSPSE self-efficacy and SPPA self-concept items) in order to determine whether or not self-efficacy and self-concept are distinct constructs. This analysis is presented in the next section.

Table 2.18 Bivariate correlations and descriptive statistics between first-order and second-order self-efficacy and self-concept factors

Factors	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SC1	SC2	SC3	SC4	SC5	SC6	SC7	SC8	sec SF1	sec SF2	sec SC1	sec SC2	sec SC3
SF1	-																			
SF2	.42**	-																		
SF3	.46**	.20**	-																	
SF4	.35**	.17**	.42**	-																
SF5	.56**	.28**	.47**	.36**	-															
SF6	.61**	.34**	.46**	.35**	.49**	-														
SF7	.66**	.38**	.45**	.38**	.47**	.52**	-													
SC1	.24**	.08**	.31**	.34**	.13**	.28**	.24**	-												
SC2	.18**	.13**	.31**	.08*	.18**	.20**	.13**	.12**	-											
SC3	.40**	.47**	.08*	.07*	.17**	.35**	.33**	.13**	.06	-										
SC4	.19**	-.00	.33**	.74**	.20**	.24**	.22**	.43**	.06	-.01	-									
SC5	.25**	.09*	.31**	.14**	.19**	.20**	.20**	.15**	.14**	.10**	.11**	-								
SC6	.29**	.10**	.52**	.36**	.25**	.31**	.27**	.35**	.43**	.04	.36**	.24**	-							
SC7	.13**	.02	.26**	.20**	.08*	.22**	.10**	.23**	.23**	-.02	.18**	.14**	.28**	-						
SC8	.56**	.28**	.43**	.30**	.35**	.40**	.57**	.28**	.22**	.39**	.24**	.32**	.33**	.13**	-					
secSF1	.85**	.70**	.49**	.39**	.57**	.78**	.81**	.26**	.20**	.50**	.20**	.23**	.30**	.14**	.57**	-				
secSF2	.56**	.26**	.77**	.82**	.74**	.54**	.55**	.35**	.22**	.13**	.59**	.26**	.48**	.23**	.45**	.61**	-			
secSC1	.25**	.04	.38**	.65**	.20**	.31**	.27**	.84**	.10**	.07**	.85**	.15**	.42**	.24**	.30**	.27**	.56**	-		
secSC2	.57**	.46**	.30**	.22**	.31**	.44**	.53**	.24**	.16**	.85**	.13**	.25**	.22**	.06**	.82**	.64**	.34**	.22**	-	
secSC3	.25**	.10**	.47**	.27**	.22**	.32**	.21**	.30**	.72**	.03**	.25**	.23**	.71**	.77**	.29**	.28**	.40**	.33**	.19**	-
Mean	18.05	22.43	20.82	20.18	16.89	18.27	18.79	17.90	23.36	19.22	17.47	23.30	23.38	19.90	20.34	19.39	19.30	17.69	19.78	22.21
SD	4.37	4.73	4.17	5.95	4.21	4.15	4.32	6.45	5.36	5.89	6.83	4.82	4.47	7.00	5.38	3.45	3.75	5.61	4.67	4.13

Note: Self-efficacy factors are prefixed by ‘SF’ and self-concept factors by ‘SC’. Second-order factors are also prefixed by ‘sec’.

Self-efficacy: SF1–Self-Efficacy for Self-Regulated Learning; SF2–Self-Regulatory Efficacy for Good Conduct; SF3–Self-Assertive Self-Efficacy; SF4–Sports Self-Efficacy; SF5–Communication/Performing Arts Self-Efficacy; SF6–Social Self-Regulatory Efficacy; SF7–Mathematics/Science Self-Efficacy; secSF1–Academic & Self-Management Self-Efficacy; secSF2–Social Self-Efficacy. *Self-concept*: SC1–Physical Appearance Self-Concept; SC2–Close Friendship Self-Concept; SC3–Behavioural Conduct Self-Conduct; SC4–Athletic Self-Concept; SC5–Job Self-concept; SC6–Social Acceptance Self-Concept; SC7–Romantic Appeal Self-Concept; SC8–Scholastic Self-Concept; secSC1–Physical Self-Concept; secSC2–Scholastic & Behavioural Self-Concept; secSC3–Social Self-Concept.

*Correlation significant at $p < .05$; **Correlation significant at $p < .01$ (two-tailed).

2.3.4 Aggregate self-efficacy and self-concept

Aggregate: First-order factor analysis

Principal factors analysis using all 97 items (57 MSPSE; 40 SPPA) extracted 19 factors with pre-rotational eigenvalues above 1.0, accounting for 61.15% of the total variance. Examination of the rotated pattern matrix revealed 15 items that did not load onto any factor: 12 items from the MSPSE and three items from the SPPA[15]. In addition, six factors contained only two or three items. Parallel analysis (O'Connor, 2000) using all 97 items revealed 10 factors greater than what might have been expected to occur by chance, i.e. eigenvalues for the real data exceeded eigenvalues for the randomly generated data in the first 10 cases. This suggests that 10 factors would provide a more interpretable solution. Examination of the scree plot also indicated a break at 10. An additional factor analysis was therefore undertaken, constraining the factors to 10 and dropping the 15 items that did not load in the initial analysis. These 10 factors accounted for 52.17% of the variance in total[16]. Table 2.19 shows the rotated pattern matrix, percentages of variance explained, and reliabilities. Of the 82 items in the analysis, 11[17] did not load on to any factor and have not been interpreted as part of the factor structure. This left 71 items for interpretation.

[15] MSPSE items excluded = 1, 2, 4, 10, 18, 24, 29, 33, 34, 41, 46, 47. SPPA items excluded = 1, 10, 32. All item numbers are consistent with those given by the original authors.

[16] Note that two additional first-order factor structures were inspected – a nine-factor structure and an 11-factor structure. Both of these provided a less theoretically meaningful interpretation than did the 10-factor solution, therefore the 10-factor solution was retained. The factor structures were also examined using a .40 cut-off criterion. However, the .30 criterion was retained as it was thought important to keep this consistent with previous factor analyses undertaken on the MSPSE and the SPPA.

[17] Self-efficacy items 3, 44, 45, 54, 55, 56, 57; self-concept items 15, 29, 33, 42.

Table 2.19 Aggregate self-efficacy and self-concept: First-order rotated pattern coefficients

Item number	Subscale codes	First-order pattern matrix									
		CY1	CY2	CY3	CY4	CY5	CY6	CY7	CY8	CY9	CY10
sf19	sregl	_.70_	.00	.06	.02	.07	-.04	.03	-.13	.07	-.02
sf20	sregl	_.68_	-.02	.05	-.00	.05	-.05	-.00	-.15	.04	-.01
sf15	sregl	_.66_	.04	-.01	.03	-.07	.00	.03	.06	.07	.10
sf16	sregl	_.66_	.05	-.02	-.04	.06	-.03	-.01	-.10	.03	.07
sf23	sregl	_.66_	.05	-.04	.07	.05	-.01	.02	-.06	.03	.08
sf17	sregl	_.62_	-.01	.05	-.05	-.04	-.11	-.04	-.08	.06	-.01
sf14	sregl	_.61_	-.03	.05	-.01	.04	-.09	.05	-.04	.01	.18
sf21	sregl	_.55_	.05	-.05	.07	.04	-.07	-.05	-.23	.07	-.01
sf22	sregl	_.52_	-.02	.02	-.01	.04	-.03	-.07	-.08	.00	.08
sf13	aca	_.34_	-.03	.05	.06	.07	.01	-.20	-.12	_.32*_	-.04
sc3	athc	-.03	_.89_	.02	.01	-.03	-.02	.07	.06	-.03	-.01
sf25	exa	.03	_.82_	-.03	-.03	.02	.05	.01	-.04	.08	-.02
sf32	exa	-.00	_.76_	.01	-.05	.11	.01	.03	-.12	.14	-.01
sc12	athc	-.05	_.76_	-.09	.10	-.09	.01	-.06	.03	.02	.04
sf31	exa	.03	_.75_	.00	-.06	.12	-.03	.05	-.16	.12	-.02
sc39	athc	-.05	_.74_	.01	.06	-.01	.03	.04	.02	-.03	.02
sc21	athc	-.00	_.72_	-.09	.05	-.03	.04	-.05	.05	.01	.00
sc30	athc	-.06	_.70_	.06	.03	-.04	-.03	.03	.01	-.05	.04
sc26	cf	-.16	-.09	_.63_	-.04	.04	.05	.02	-.07	.10	.05
sc44	cf	-.07	-.06	_.62_	-.02	.02	-.02	.06	-.07	.06	.02
sc17	cf	.05	-.08	_.57_	-.03	-.09	.03	.05	.11	.15	.11
sc35	cf	.03	.06	_.57_	.08	.04	.01	-.07	-.03	-.09	.06
sc2	soca	.06	.16	_.46_	.04	-.02	-.02	-.17	-.01	-.07	-.12
sc8	cf	.02	.03	_.45_	.01	.02	-.05	-.18	-.04	-.04	.00
sc11	soca	.12	.14	_.43_	.05	.09	-.06	-.14	.01	-.07	-.21
sc38	soca	.16	.14	_.35_	.16	.02	-.10	-.15	.05	-.12	-.06
sc20	soca	.12	.10	_.33_	.09	.05	-.11	.01	.08	.00	.05
sc40	phya	.01	-.01	-.08	_.82_	-.02	-.00	-.00	.00	.04	.01
sc22	phya	-.10	.04	.03	_.80_	.05	.01	.11	-.03	.03	.02
sc13	phya	-.11	.02	-.01	_.80_	.03	.06	.08	-.03	.06	.04
sc4	phya	.01	-.01	.06	_.75_	-.00	.04	.04	-.04	-.05	.08
sc31	phya	.01	.01	-.03	_.71_	-.04	.01	-.10	.01	.02	-.05
sc24	roma	.18	.09	-.03	_.48_	-.02	-.12	-.13	.12	-.06	-.12
sc6	roma	.06	.15	-.07	_.33_	-.11	-.08	-.17	.09	-.04	-.07
sf39	srege	-.16	.03	.01	-.01	_.81_	-.06	-.06	-.08	-.01	-.13
sf38	srege	-.10	.01	.03	-.04	_.81_	-.06	-.01	-.07	-.03	-.14
sf37	srege	10	.02	-.04	-.00	_.76_	-.01	-.04	.09	-.04	.16
sf35	srege	.03	.07	-.08	.09	_.53_	-.02	-.08	.03	-.00	_.34*_
sf40	srege	.14	-.12	.10	-.04	_.51_	.07	.03	.08	.09	.17
sf36	srege	.21	-.00	-.04	.06	_.47_	.08	-.01	.16	.08	.28
sc23	jobc	.03	-.01	-.10	-.07	.06	_-.78_	.03	.13	.02	.01
sc5	jobc	.00	-.05	-.02	-.07	.01	_-.68_	.01	.06	.07	-.04
sc41	jobc	.01	-.05	-.03	.05	-.01	_-.67_	.02	-.04	.02	.00
sc14	jobc	-.07	.04	.10	.04	-.02	_-.45_	-.01	-.15	-.01	.12
sf51	asse	-.11	.03	-.01	-.01	.04	-.01	_-.78_	-.06	-.02	-.08
sf53	asse	-.02	-.06	-.01	.01	.10	-.02	_-.72_	-.09	-.01	.05
sf52	asse	-.01	-.01	-.01	.09	.04	.04	_-.67_	.04	-.04	.07
sf50	asse	-.07	-.03	.00	-.02	-.03	-.19	_-.66_	-.11	.16	-.02
sf49	soce	.07	.15	.25	-.06	.02	-.04	_-.49_	.06	.16	-.00
sf48	soce	.03	.08	.29	-.03	.03	-.08	_-.43_	.01	.18	-.04
sf08	aca	.25	-.00	-.04	.06	.08	.04	-.05	_-.52_	.10	-.05
sf07	aca	.29	.04	-.09	.11	.07	-.00	-.05	_-.47_	-.47	.01
sf05	aca	.18	.18	.01	-.01	-.03	.02	-.14	_-.46_	-.04	.03
sf06	aca	.18	.12	.01	-.03	-.04	.00	-.14	_-.40_	.04	.08
sc37	schc	-.01	.04	.06	.15	-.08	-.17	-.19	_-.36_	-.03	.22

Table continued over the page…

Table 2.19 continued…

Item number	Subscale codes	First-order pattern matrix									
		CY1	**CY1**	**CY1**	**CY1**	**CY1**	**CY1**	**CY1**	**CY1**	**CY1**	**CY1**
sc28	schc	.05	.11	.12	-.07	-.04	-.18	-.04	-*.35*	-.08	.26
sf26	exa	-.03	.08	.15	-.07	.03	.05	-.01	.17	*.63*	-.04
sf30	exa	.01	.12	-.07	.01	-.04	-.10	-.02	.02	*.61*	.02
sf27	exa	-.08	.02	.01	.06	.01	-.07	-.02	-.04	*.60*	-.05
sf28	exa	.18	.05	-.03	.03	-.02	-.04	-.03	.50	*.50*	.01
sf12	aca	.20	-.03	.07	-.01	.05	-.07	-.22	-.21	*.36*	-.09
sf9	aca	.21	-.07	.10	.09	.11	.01	-.11	-.22	*.31*	-.04
sf11	aca	.28	.03	.07	.10	.03	.01	.07	-.16	*.31*	.01
sc34	behc	.00	.04	.01	-.03	.13	.01	.10	.00	-.03	*.63*
sc16	behc	.05	-.06	.06	.03	.07	.02	.07	-.03	-.03	*.62*
sc43	behc	.05	-.02	-.02	.11	.02	-.03	-.04	.05	.00	*.55*
sc7	behc	.07	.05	.01	-.03	.01	-.07	-.10	-.03	-.03	*.53*
sf42	othe	.13	.08	-.04	.05	.14	.00	-.05	-.22	.10	*.39*
sf43	othe	.23	.04	-.03	.01	.14	-.00	-.05	-.26	.11	*.36*
sc19	schc	.23	.03	.13	.04	-.03	-.12	-.04	-.20	.01	*.32*
sc25	behc	.00	.01	.17	.24	-.05	-.10	-.11	-.04	.02	*.32*
% variance explained		20.68	7.73	4.63	3.97	3.48	2.74	2.54	2.37	2.11	1.92
Reliabilities (Cronbach's)		.92	.92	.79	.87	.83	.73	.86	.79	.77	.88

Note: Item numbers are as the original *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990) and the original *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988). MSPSE item numbers are prefixed by "sf" and SPPA item numbers are prefixed by "sc". Subscale codes relate to the original subscales.

MSPSE: sregl–Self-Regulated Learning; aca–Academic Achievement; exa–Leisure-Time Skills & Extracurricular Activities; srege–Self-Regulatory Efficacy; asse–Self-Assertive Efficacy; soce–Social Self-Efficacy; othe–Meet Others' Expectations. *SPPA*: athc–Athletic Competence; cf–Close Friendship; soca–Social Acceptance; phya–Physical Appearance; roma–Romantic Appeal; jobc–Job Competence; schc–Scholastic Competence; behc–Behavioural Conduct.

F1–Self-Efficacy for Self-Regulated Learning; F2–Athletics/Sports Competency; F3–Friendship Self-Concept; F4–Physical Appearance Self-Concept; F5–Self-Regulatory Efficacy for Good Conduct; F6–Job Self-Concept; F7–Self-Assertive Efficacy; F8–Mathematics/Science Competency; F9–Communication/Performing Arts Self-Efficacy; F10–Good Conduct Competency.

Factor coefficients ≥ .30 are italicised.

*Indicates cross-factor loadings; these are not included in factor interpretations or reliability calculations.

The resulting factors were named and are shown in Table 2.20, together with the items that represent each factor (MSPSE self-efficacy items are prefixed by 'sf' and SPPA self-concept items by 'sc'). Because the aim of this section was to determine whether self-efficacy and self-concept overlap on aspects of perceived competence, this aggregate factor structure is henceforth referred to as the *competency structure* (and factor numbers within this structure are prefixed with CY). Extracted factors composed of both self-efficacy and self-concept items are referred to as *competency factors*.

None of the factors map exactly any of the original MSPSE or SPPA subscales, although there are some similarities. In cases where factors were similar to the original subscales the same factor names were used. The exception to this was Self-Regulatory Efficacy for Good Conduct (*Factor CY5*). This factor is similar to the factor of the same name derived from the individual self-efficacy extraction but excludes the two items relating to school behaviours (i.e. Items sf33 and sf34). Consistent with the self-efficacy extraction, this factor has been given a narrower description than did Bandura; rather than classifying this as a general self-regulation construct, here this factor has been specified as relating to self-regulation for good conduct. Of the other factors, three are specifically of note. *Factor CY3* (Friendship Self-Concept) combines the five SPPA Close Friendship items with four SPPA Social Acceptance items. As the Social Acceptance items are about making friends they fit in well here. *Factor CY7* (Self-Assertive Efficacy) combines the four MSPSE Self-Assertive Efficacy items with two Social Self-Efficacy items that reflect carrying on conversations with others and working in a group. As these both represent assertive behaviours the self-assertive interpretation/name for this factor has been retained. *Factor CY9* has been interpreted as a Communication/ Performing Arts factor as some of the items within this factor (sf9, sf11, sf12, sf28) can be classed as communication disciplines.

As can be seen from Table 2.20, at this aggregate first-order level there is some evidence of separation of self-efficacy and self-concept. Of the ten factors, four contain *only* MSPSE self-efficacy items (CY1, CY5, CY7, CY9) and three contain *onl*y SPPA self-concept items (CY3, CY4, CY6). There is also evidence of conceptual overlap, however. The remaining three factors combine self-efficacy/competency self-concept items and as such have been interpreted as competency factors (CY2: *Athletics/Sports Competency*; CY8: *Mathematics/Science Competency*; CY10: *Good Conduct Competency*), thereby reflecting the theoretical argument that self-efficacy and self-concept overlap on elements of competence. All three factors are theoretically meaningful and interpretable.

Table 2.20 First-order aggregate factors showing the items they are composed of and which original measure/subscale the items originate from

Factor name	Measure	Original subscale	Item no.	Item
CY1. Self-Efficacy for Self-Regulated Learning[a]	MSPSE	Self-Efficacy for Self-Regulated Learning	sf14	…finish your homework assignment by deadlines
			sf15	…study when there are other interesting things to do
			sf16	…concentrate on school subjects
			sf17	…take notes in class
			sf19	…plan your schoolwork
			sf20	…organise your schoolwork
			sf21	…remember information that is presented in class and in textbooks
			sf22	…arrange a place to study without distractions
			sf23	…motivate yourself to do schoolwork
	MSPSE	Academic Achievement	sf13	…learn English grammar
CY2. Athletics / Sports Competency[b]	SPPA	Athletic Competence	sc3	I do very well at all kinds of sports
			sc12	I think I could do well at just about any new athletic activity
			sc21	I feel that I am better than others my age at sports
			sc30	I don't do very well at new outdoor games
			sc39	I do not feel that I am very athletic
	MSPSE	Leisure-Time Skills and Extracurricular Activities	sf25	…learn sports skills
			sf31	…do regular physical education activities
			sf32	…learn the things needed for team sports (for example, football, netball, basketball, volleyball, swimming)
CY3. Friendship Self-Concept	SPPA	Close Friendship	sc8	I am able to make really close friends
			sc17	I do have a really close friend I can share secrets with
			sc26	I wish I had a really close friend to share things with
			sc35	I find it hard to make friends that I can really trust
			sc44	I *don't* have a friend that is close enough to share really personal thoughts with
	SPPA	Social Acceptance	sc2	I find it hard to make friends
			sc11	I have a lot of friends
			sc20	I am very hard to like
			sc38	I feel that I am socially accepted by people my own age
CY4. Physical Appearance Self-Concept[c]	SPPA	Physical Appearance	sc4	I am *not* happy with the way I look
			sc13	I wish my body was different
			sc22	I wish my physical appearance was different
			sc31	I think that I am good looking
			sc40	I really like my looks
	SPPA	Romantic Appeal	sc6	I feel that if I fancy someone, that person will like me back
			sc24	I feel that people my age will fancy me
CY5. Self-Regulatory Efficacy for Good Conduct	MSPSE	Self-Regulatory Efficacy	sf35	…resist peer pressure to smoke cigarettes
			sf36	…resist peer pressure to drink alcohol
			sf37	…resist peer pressure to smoke marijuana (cannabis, pot, weed, draw)
			sf38	…resist peer pressure to take ecstasy
			sf39	…resist peer pressure to use crack (cocaine)
			sf40	…resist peer pressure to have sexual intercourse
CY6. Job Self-Concept[a]	SPPA	Job Competence	sc5	I feel that I am ready to do well at a part-time job
			sc14	I feel that I *don't* have enough skills to do well at a part-time job
			sc23	I feel that I am old enough to get and keep a part-time paying job
			sc41	I feel that I am really able to handle the work on a part-time paying job
CY7. Self-Assertive Efficacy[d]	MSPSE	Self-Assertive Efficacy	sf50	…express your opinions when other classmates disagree with you
			sf51	…stand up for yourself when you feel that you are being treated unfairly

Table continued over the page…

Table 2.20 continued…

Factor name	Measure	Original subscale	Item no.	Item
CY7. Self-Assertive Efficacy[d]	MSPSE	Self-Assertive Efficacy	sf52	…deal with situations where others are annoying you or hurting your feelings
			sf53	…stand firm to someone who is asking you to do something unreasonable or inconvenient
	MSPSE	Social Self-Efficacy	sf48	…carry on conversations with others
			sf49	…work in a group
CY8. Mathematics / Science Competency	MSPSE	Academic Achievement	sf5	…learn general mathematics
			sf6	…learn algebra
			sf7	…learn science
			sf8	…learn biology
	SPPA	Scholastic Competence	sc28	I have trouble figuring out the answers in school
			sc37	I feel that I am pretty intelligent
CY9. Communication / Performing Arts Self-Efficacy[e]	MSPSE	Leisure-Time Skills and Extracurricular Activities	sf26	…learn dance skills
			sf27	…learn music skills
			sf28	…do the kinds of things needed to be a member of the school newspaper
			sf30	…do the kinds of things needed to take part in school plays
	MSPSE	Academic Achievement	sf9	…learn reading, writing, and language skills
			sf11	…learn a foreign language
			sf12	…learn social studies
CY10. Good Conduct Competency	SPPA	Behavioural Conduct	sc7	I usually do the right thing
			sc16	I often get in trouble for the things I do
			sc25	I feel really good about the way I often act
			sc34	I do things I know I shouldn't do
			sc43	I usually act the way I know I'm supposed to
	SPPA	Scholastic Competence	sc19	I do very well at my class work
	MSPSE	Meet Others' Expectations	sf42	…live up to what your parents expect of you
			sf43	…live up to what your teachers expect of you

Note: MSPSE: *Multidimensional Scales of Perceived Self-Efficacy* (Bandura, 1990); SPPA: *Self-Perception Profile for Adolescents* (Harter, 1988). Item numbers are as the original MSPSE and SPPA. MSPSE item numbers are prefixed by 'sf' and SPPA item numbers are prefixed by 'sc'. MSPSE items are prefixed with 'How well can you…?'. SPPA items show only the first statement of each item pair.
[a]This factor is identical to one produced by the individual factor analysis. [b]This factor represents a combination of the Athletic Self-Concept and Sports Self-Efficacy factors produced by the individual extractions. [c]This factor is similar to the Physical Appearance factor derived from the individual self-concept extraction but has an additional Romantic Appeal item. [d]This factor is similar to the Self-Assertive Efficacy factor derived from the individual self-efficacy extraction but does not include Item sf24. [e]This item is similar to the factor of the same name derived from the individual self-efficacy extraction, but includes sf9 and sf11 instead of sf13 and sf29.

Aggregate: Second-order factor analysis

In order to determine whether a hierarchical structure underlies the first-order competency structure, and to assess whether self-concept/self-efficacy items overlap at a higher-order level, a second-order factor analysis was conducted using the 10 first-order factor scores – computed by taking the mean response for items that identify a given factor. The initial PFA extracted two factors with pre-rotational eigenvalues above 1.0, explaining 51.06% of the total variance. However, the scree plot and parallel analysis on the 10 first-order factors (using PFA syntax; O'Connor, 2000) indicated that four second-order factors would be more appropriate. An additional second-order factor analysis was therefore undertaken, constraining the factors to four. These four factors explained 68.84% of the variance in total. The rotated pattern matrix is presented in Table 2.21. As the table shows, in contrast to the findings for the first-order factor analysis, there is clear evidence of overlap between the constructs; all four second-order factors are comprised of both self-concept and self-efficacy first-order factors. All four produce a meaningful interpretation. Because all four combine self-efficacy/self-concept items, they have been interpreted as competency factors. They were named and are listed below[18].

secCY1. *Academic Competency*: Composed of Self-Efficacy for Self-Regulated Learning; Communication/Performing Arts Self-Efficacy; and Mathematics /Science Competency, a factor containing both MSPSE and SPPA items.

secCY2. *Behavioural Conduct Competency*: Composed of Good Conduct Competency, a combined MSPSE/SPPA factor; and Self-Regulatory Efficacy for Good Conduct.

secCY3. *Sports and Physical Appearance Competency*: Composed of Physical Appearance Self-Concept; and Athletics/Sports Competency, a combined MSPSE/SPPA factor.

secCY4. *Social Competency*: Composed of Friendship Self-Concept; Self-Assertive Efficacy; and Job Self-Concept.

Table 2.21 Aggregate self-efficacy and self-concept: Second-order rotated pattern coefficients

First-order aggregate factors	Second-order pattern matrix			
	secCY1. Academic Competency	secCY2. Behavioural Conduct Competency	secCY3. Sports & Physical Appearance Competency	secCY4. Social Competency
Self-Efficacy for Self-Regulated Learning (CY1)	*.75*	-.22	.07	-.03
Communication/Performing Arts Self-Efficacy (CY9)	*.60*	.02	-.00	.12
Mathematics/Science Competency (CY8)	*.37*	-.23	.18	.14
Good Conduct Competency (CY10)	-.01	*-.94*	.14	-.00
Self-Regulatory Efficacy for Good Conduct (CY5)	.11	*-.42*	-.10	.00
Physical Appearance Self-Concept (CY4)	-.10	-.09	*.70*	.06
Athletic/Sports Competency (CY2)	.17	.11	*.59*	.02
Friendship Self-Concept (CY3)	.15	.10	.06	*.69*
Self-Assertive Efficacy (CY7)	-.08	-.01	.00	*.66*
Job Self-Concept (CY6)	.04	-.05	.01	*.33*
% variance explained	37.25	13.80	9.50	8.28
Reliabilities (Cronbach's)	.78	.59	.59	.57

Note: Factor coefficients ≥ .30 are italicised.

[18] Note that two additional second-order structures were inspected – a two-factor structure and a three-factor structure. Both provided a less theoretically meaningful interpretation than did the four-factor solution, with a number of cross-factor loadings. The three-factor solution also contained a one-item factor. Therefore the four-factor solution was retained.

Table 2.22 shows the pattern of correlations between aggregate first- and second-order factors. Consistent with the individual self-efficacy and self-concept factor analyses, the pattern of correlations between aggregate first- and second-order factors is clearly compatible with a hierarchical structure, i.e. there are high positive relationships between a second-order factor and the first-order factors it is composed of, but low correlations with those it is not composed of (Byrne, 1996). The possible implications of this hierarchical structure are explored in the Discussion section of this chapter.

Table 2.22 Aggregate self-efficacy and self-concept: Correlations between first- and second-order factors

First-order aggregate factors	Second-order aggregate factors			
	secCY1. Academic Competency	secCY2. Behavioural Conduct Competency	secCY3. Sports & Physical Appearance Competency	secCY4. Social Competency
Self-Efficacy for Self-Regulated Learning (CY1)	.88**	.51**	.32**	.46**
Communication/Performing Arts Self-Efficacy (CY9)	.81**	.31**	.26**	.40**
Mathematics/Science Competency (CY8)	.80**	.39**	.35**	.44**
Good Conduct Competency (CY10)	.60**	.77**	.25**	.32**
Self-Regulatory Efficacy for Good Conduct (CY5)	.32**	.92**	.04	.15**
Physical Appearance Self-Concept (CY4)	.27**	.13**	.81**	.35**
Athletic/Sports Competency (CY2)	.36**	.11**	.88**	.36**
Friendship Self-Concept (CY3)	.33**	.18**	.30**	.70**
Self-Assertive Efficacy (CY7)	.51**	.23**	.42**	.87**
Job Self-Concept (CY6)	.27**	.13**	.17**	.64**

** Correlation is significant at p < .01 (two-tailed).

Summary of the aggregate factor analyses

Taken together, these findings demonstrate that the structure of aggregate self-efficacy and self-concept is both multidimensional and hierarchical, as would be expected following the individual factor analyses. There is some overlap of constructs at the first-order level, although the majority of first-order factors distinctly measure self-efficacy *or* self-concept. There is considerable overlap of self-efficacy and competency-related self-concept at the second-order level, however. None of the factors are distinct.

2.4 Discussion

2.4.1 Self-efficacy factor analysis

This exploration of the psychometric properties of the MSPSE confirms that self-efficacy is a multidimensional construct with a hierarchical structure. The first-order factors that emerged, however, are only broadly consistent with those proposed by Bandura (1990);

none replicate exactly, although two closely parallel his interpretation. The results also show that 11 items do not relate well to the proposed MSPSE subscales. Furthermore, the suggestion here that self-efficacy has a higher-order level of only two dimensions is in contrast to previous research that proposes three underlying dimensions. Several departures from previously proposed structures are discussed.

Figure 2.1 (p. 99) shows the hierarchical model of the first- and second-order self-efficacy factors. Two of the MSPSE factors replicate closely – Self-Efficacy for Self-Regulated Learning and Self-Regulatory Efficacy (called Self-Regulatory Efficacy for Good Conduct here). Self-Efficacy for Self-Regulated Learning explained more variance than any other factor, consistent with Choi et al. (2001) and Miller et al. (1999), and achieved higher internal reliability than Bandura's interpretation when applied to these data. A third factor is similar to Bandura's interpretation (Self-Assertive Efficacy); this factor contains all the original MSPSE Self-Assertive items plus three others which fit well with the self-assertive interpretation. Two other of the MSPSE subscales (Academic Achievement and Leisure-Time Skills/Extracurricular Activities) split to create elements of the proposed Mathematics/Science, Communication/Performing Arts, and Sports factors. The remaining four of the MSPSE subscales (Social Resources, Parental/Community Support, Meet Others' Expectations, and Social Self-Efficacy) did not replicate in this structure, although all of the MSPSE Parental/Community Support items and a few items from the other three subscales comprised the proposed Social Self-Regulatory Efficacy factor. A number of other items were placed within other identified factors.

The first thing of note here is that there was strong evidence of a distinct component associated with self-regulated learning for academic activities. This closely corresponds to Bandura's and has been clearly replicated a number of times: here, and by Choi et al. (2001) and Miller et al. (1999). This appears to cut across academic domains, such that behaviours intended to aid in the achievement of academic goals (e.g. taking notes in class), generalise across academic subjects. By contrast, there was very little evidence for a clear, cross-subject academic self-efficacy factor such as that proposed by Bandura. Rather, the factor relating to academic achievement appears to be subdivided into two domains by subject area, with separation between communication/performing arts and mathematics/science disciplines. Hence, although it is meaningful to talk about students having a domain-specific representation of self-efficacy for academic self-regulated learning, there is no evidence that students have a unified representation of general, cross-subject self-efficacy for academic achievement.

The separation between communication/performing arts and mathematics/science disciplines at the first-order level is consistent with Choi et al., but in contrast to Miller et al. It is also consistent with Bong's (1997, 1999) suggestion that two subject-specific higher-order factors, Verbal and Quantitative, underlie problem-specific academic self-efficacy beliefs. Such results pose questions as to whether the division between mathematics/science and communication/performing arts is a consequence of the way that schools divide subjects, or whether it is based on a cognitive distinction; between spatial and verbal skills, for example. Given that self-efficacy is a meta-cognitive judgement, it would be natural for it to divide along cognitive lines.

The second-order analysis demonstrates a two-factor solution: Academic and Self-Management Self-Efficacy, and Social Self-Efficacy. The data suggest there is a clear distinction between what one can do academically and one can do socially. Interestingly, the academic factor includes three first-order factors that assess perceived ability to regulate one's behaviour in different contexts: social, personal (i.e. good conduct), and academic. This suggests that while self-regulation factors are distinct at one level, they combine into a more general factor at a higher level of the self-efficacy hierarchy that appears to be related to overall academic functioning. This is unlike the social second-order factor which seems to be less associated with self-efficacy in institutional contexts. This two factor solution is different from that identified by Choi et al. and Miller et al. who demonstrated three second-order constructs: *Social Self-Efficacy*, *Academic Self-Efficacy*, and *Task Management Efficacy* with first-order self-regulatory factors being separate from first-order academic factors.

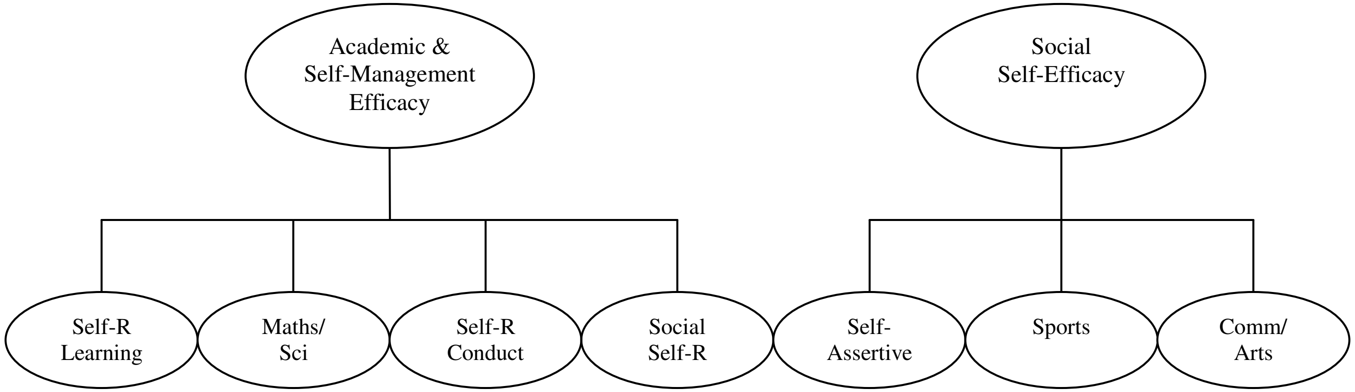
Another interesting feature is that there was not a single distinct academic self-efficacy factor. Rather, the two first-order academic sub-domains (Mathematics/Science and Communication/Performing Arts), seem to have different associations: Mathematics is academic, whereas Arts is grouped with sports and assertiveness. Choi et al. and Miller et al. also demonstrated this association.

The finding of a Social Self-Regulation first-order factor has been difficult to interpret in relation to the overall structure; this factor was also weakly correlated with the second-order social factor. This may relate to a developmental issue concerning middle adolescents' self-representations. Developmental models of self-concept argue that self-concept becomes increasingly differentiated, i.e. more multidimensional, as one gets older (Harter, 1983; Shavelson et al., 1976; Wigfield et al., 1997). Such models propose that because self-perceptions are about *how* people represent themselves then they are not necessarily going to be clear, or coherent. For example, older children tend to have more social situations in which to represent themselves, whereas for younger children, social interaction is less diverse and this is likely to be reflected in their self-perceptions. Thus with age, self-concept is likely to be more clearly differentiated. Marsh and Ayotte (2003) demonstrated that self-concept becomes increasingly differentiated up to preadolescence. The pattern of their results also indicates that this differentiation might continue with older students.

It follows, then, that because self-efficacy and self-concept percepts are closely related, perceptions of self-efficacy may also become more differentiated with age, although this has yet to be tested empirically. In support of this it is worth noting that Choi et al. (2001), who used undergraduate students as opposed to the middle adolescent age-group used here, showed a clearer differentiation of factors than did this study; the items that represented the first-order Social Self-Regulation factor identified here broke down into two separate first-order factors in their interpretation, each of which loaded onto separate second-order factors; Social and Task Management. Miller et al. (1999), who used only a marginally older sample than that used here, reported a similar cross-factor loading to this study in their second-order analyses, providing further support for age-related differentiation of self-efficacy.

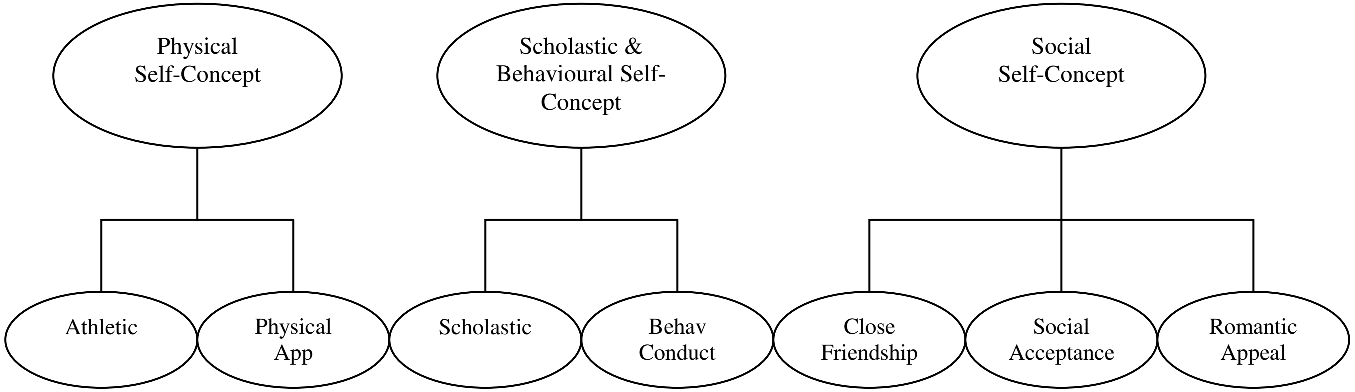
There may, however, be another explanation for the observed differences between this proposed structure and Choi et al. and Miller et al.'s structures – cultural differences. Both Choi et al. and Miller et al. used a US sample. It could be that US and UK students have different educational cultures that impact differently on self-efficacy beliefs. For example, the US might highlight competency in academic domains, whereas if school in the UK is seen as essentially managing oneself to behave then this could be why the first-order academic (Mathematics/Science) and self-regulation factors found here loaded on a single second-order factor.

Figure 2.1 Self-efficacy factor analysis: Hierarchical model of first- and second-order factors



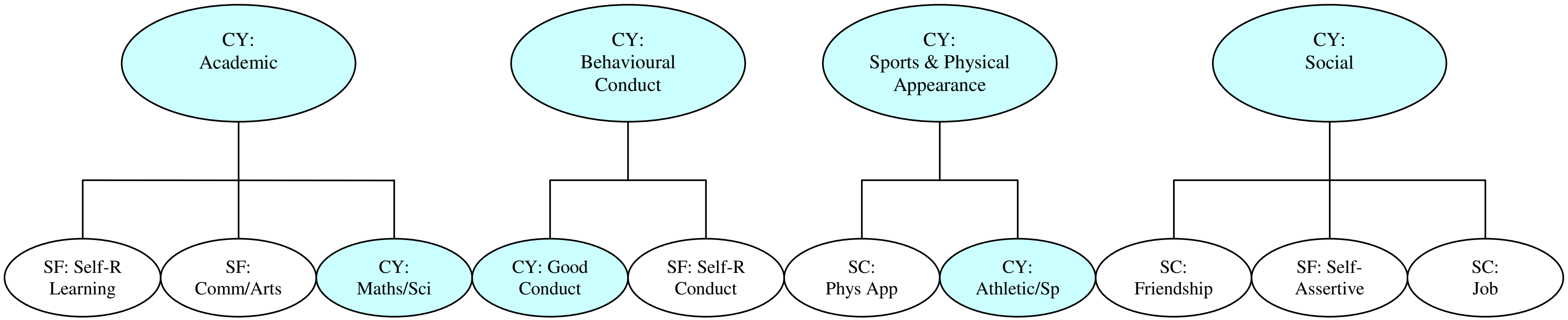
Hierarchical factor structure showing which first-order factors map onto which second-order factors. *First-order factors*: Self-R Learning–Self-Efficacy for Self-Regulated Learning; Maths/Sci–Mathematics/Science Self-Efficacy; Self-R Conduct–Self-Regulatory Efficacy for Good Conduct; Social Self-R–Social Self-Regulatory Efficacy; Self-Assertive–Self-Assertive Efficacy; Sports–Sports Self-Efficacy; Comm/Arts–Communication/Performing Arts Self-Efficacy.

Figure 2.2 Self-concept factor analysis: Hierarchical model of first- and second-order factors



Hierarchical factor structure showing which first-order factors map onto which second-order factors. *First-order factors*: Athletic–Athletic Self-Concept; Physical App–Physical Appearance Self-Concept; Scholastic–Scholastic Self-Concept; Behav Conduct–Behavioural Conduct Self-Concept; Close Friendship–Close Friendship Self-Concept; Social Acceptance–Social Acceptance Self-Concept; Romantic Appeal–Romantic Appeal Self-Concept. Note that the first-order factor *Job Self-Concept* did not load onto the second-order factor matrix and has therefore not been interpreted into the structure.

Figure 2.3 Aggregate self-efficacy and self-concept: Hierarchical model of first- and second-order factors



Hierarchical factor structure showing which first-order factors map onto which second-order factors. SF–self-efficacy factors; SC–self-concept factors; CY–competency factors (combined self-efficacy/self-concept factors; indicated by shaded areas). *SF first-order factors*: Self-R Learning–Self-Efficacy for Self-Regulated Learning; Comm/Arts–Communication/Performing Arts Self-Efficacy; Self-R Conduct–Self-Regulatory Efficacy for Good Conduct; Self-Assertive–Self-Assertive Efficacy. *SC first-order factors*: Phys App–Physical Appearance Self-Concept; Friendship–Friendship Self-Concept; Job–Job Self-Concept. *CY first-order factors*: Maths/Sci–Mathematics/Science Competency; Good Conduct–Good Conduct Competency; Athletic/Sp–Athletics/Sports Competency.

2.4.2 Self-concept factor analysis

These findings exploring the psychometric properties of the SPPA support claims that self-concept is multidimensional and can be measured at a domain-specific level. The first-order factors that emerged are, in the main, consistent with those proposed by Harter (1988). Figure 2.2 (p. 100) shows the hierarchical model of the first- and second-order self-concept factors. Of the eight factors identified, two are exactly replicated (Athletic Self-Concept and Scholastic Self-Concept) and five are substantially replicated (Physical Appearance, Close Friendship, Behavioural Conduct, Job Self-Concept, Social Acceptance). Overall, this proposed structure demonstrates higher reliabilities than the original SPPA applied to these data for four of the eight subscales (with the remaining four being consistent with Harter's interpretation). These results therefore indicate that this revised structure, which incorporates a simpler question format, provides better factorial validity than the original version. The recommendation is that this revised structure and question format be used in future research, especially with a middle adolescent age-group.

The main departure from Harter's posited SPPA structure is the nature of the identified Romantic Appeal subscale which contains only two items (consistent with Worrell, 1997, and Trent et al., 1994). These results support other researchers (Chan, 2001; Rudasill & Callahan, 2008) who have concluded that this subscale might not be relevant to younger adolescents. Future research could develop additional romantic items more relevant to this age-group so that this dimension can be measured in a more meaningful way.

Of specific note is that items that assess perceived self-concept for close friendship and social acceptance have formed two separate dimensions, which is consistent with Harter's original structure. This indicates that students of this age have separate representations of what it means to be able to make friends and to be socially accepted. This is the opposite of what some researchers have suggested (e.g. Trent et al. 1994). Trent et al. demonstrated significant overlap between close friendship and social acceptance items. Despite this, there was very limited evidence of this here, with overlap of only one item. These two factors were associated with the same second-order factor, however, indicating that they are part of the same underlying representation of the self – the social representation. Previous research has also suggested overlap between Behavioural Conduct and Close Friendship/Social Acceptance items (Chan, 2001), but the findings here did not support this. There was also no evidence that these aspects of the self are related at the second-order level; at this level Behavioural Conduct is associated with academic aspects of the self, not social aspects. This indicates that perceived ability to manage one's behaviour, and perceived ability to make friends and be socially accepted, represent distinct aspects of the self.

At the second-order level there is broad distinction between how students see themselves academically, physically, and socially. Interestingly 'academic' includes perceived ability to behave well. These aspects of the self are therefore related for this age-group. Furthermore, physical self-concept includes perceived self-concept for undertaking sports-related activities. Representations of what one can do physically and how one looks physically are therefore closely related at this age. Romantic appeal aspects of the self are associated with making friends and being socially accepted, not with the physical self. Of note here is that the job-related first-order factor was not incorporated into the overall structure. There has been some suggestion that the SPPA Job Competence items are meaningless to younger students (i.e. Chan, 2001; Trent et al. 1994; Rudasill & Callahan, 2008; Wichstrom, 1995). The results reported here showed, however, that these items form a meaningful factor, which suggests that students of this age do have a representation of being able to undertake job-related activities. On the other hand, because this factor is not associated with the structure as a whole, it suggests that this age-group do not yet have a more global idea of what it actually means to 'work'.

The analyses reported here are consistent with the suggestion that the self-concept is hierarchical. Harter (1990a) has always argued that rather than being hierarchical, various dimensions of self-concept are conceptualised such that self-esteem is on the same level as more specific judgements, rather than being something that arises out of them. This analysis does not support Harter's argument. It instead demonstrates a clear hierarchical solution, with factors corresponding to physical and social self-concept which parallel higher level domains specified by researchers espousing the hierarchical nature of self-concept (e.g. Marsh & Shavelson, 1985; Shavelson et al., 1976). These results do not, however, evidence a distinct academic/scholastic factor as postulated by such models, but instead reveal a second-order factor associated with academic (scholastic) and behavioural self-concept. This is in contrast to hierarchical models (i.e. Byrne & Shavelson, 1996) that suggest behavioural conduct is a sub-level component of the social self-concept. Harter (1990a; see also Hattie, 1992) acknowledges the possibility of a hierarchical self-concept but argues that such a model cannot be generalised to all, and that individuals differ in the extent to which a particular structure is optimal. Harter's argument about individual variation in self-concept percepts is particularly important if we consider age-related differences; self-concept might well be something that becomes more hierarchical with time. Related to this, the finding here of a second-order self-concept factor that reflects both academic and behavioural conduct first-order factors is consistent with the self-efficacy findings, and reinforces the suggestion that *both* self-concept and self-efficacy perceptions of younger age-groups lack differentiation. This may be another reason for not finding a distinct second-order academic factor. As with self-efficacy research, studies using longitudinal samples, or comparing different age-groups may further expand our knowledge of age-related dimensions of self-concept.

2.4.3 Relationship between self-efficacy and self-concept

The aggregate factor analyses revealed ten first-order and four second-order factors. Results suggest that at the domain-specific level of analysis, competency-related self-concept and self-efficacy, as measured by the SPPA and MSPSE, are fairly distinct: for seven of the first-order factors there was clear separation of self-efficacy and self-concept. At this level there does seem to be some distinction between the constructs. However, the analysis did not reveal complete separation, and three factors combined self-efficacy/self-concept elements. Compared to the first-order structure, the overlap within second-order dimensions was considerable, with all four factors sharing common aspects of self-efficacy and competency-related self-concept. The MSPSE and SPPA do not completely capture distinct aspects of personality, therefore. Results also indicate that the underlying structure of self-efficacy and competency-related self-concept is hierarchical. These results support those of Pietsch et al. (2003) and Skaalvik and Rankin (1996b).

Figure 2.3 (p. 101) shows the hierarchical model of the first- and second-order competency structures. None of the seven distinct first-order factors are identical to the proposed MSPSE or SPPA subscales, although there are similarities. Two of Harter's SPPA factors replicated closely – Physical Appearance and Job Competence. The first of these contained two romantic self-concept items, which suggests that students' perceptions of how they see themselves physically are partly dependent on whether they see themselves as physically attractive. The Physical Appearance factor was associated with the Athletics/Sports factor at the second-order level, consistent with the individual self-concept factor analysis, and indicates that physical representations of how one looks are related to what one can do physically.

Two other SPPA subscales (Social Acceptance and Close Friendship) combined to create the Friendship Self-Concept factor. It appears, therefore, that in this analysis, perceived ability to make friends and facilitate social acceptance are both part of what it means to 'make friends'. This overlap supports Trent et al.'s (1994) factor analysis of the SPPA. There was only very limited evidence of this in the individual self-concept analysis, however. In both the individual analysis and this aggregate analysis, friendship and social acceptance items form part of the social second-order factor, which indicates that they represent the same underlying aspect of the self. At this the level they are associated with items representing assertiveness self-efficacy and perceived ability for undertaking paid work. Being able to make friends, be assertive and do the things needed to keep a job are all therefore part of the social representation of the self. Note that the 'job' aspect of the self did not appear in the overall self-concept structure (see Figure 2.2). Maybe such perceptions need to be paired with perceptions of assertiveness before a student can understand what it means to 'work'.

Three of the MSPSE subscales also replicated closely – Self-Efficacy for Self-Regulated Learning, Self-Regulatory Efficacy (which has been renamed Self-Regulatory Efficacy for Good Conduct), and Self-Assertive Efficacy. The MSPSE Academic Achievement and Extracurricular Activities subscales split to create elements of the proposed Mathematics/Science, Communication/Performing Arts, and Athletics/Sports factors. The first two of these join with the Self-Regulated Learning factor at the higher order level to form an academic representation of the self. This representation of the self within a formal educational context is in contrast to the social self which is related to what one can do outside of schooling. The behavioural and sports/physical appearance higher-order representations of the self can occur within and outside of the educational environment. The self-efficacy factors derived from the aggregate MSPSE/SPPA analysis are very similar to those derived from the individual MSPSE factor analysis. The finding of a distinct first-order Self-Efficacy for Self-Regulated Learning factor is also consistent with Choi et al. (2001) and Miller et al. (1999). Consistent with these authors, this factor explained more of the variance than any other.

These findings indicate overlap of self-efficacy/self-concept elements within three first-order domains: Athletics/Sports Competency, Good Conduct Competency, and Mathematics/Science Competency. The first of these combines the SPPA Athletic Self-Concept items and the sports-related items from the MSPSE Extracurricular Activities subscale. It appears, therefore, that self-efficacy and self-concept perceptions for undertaking sports activities are conceptually part of the same underlying aspect of the self. Separate items from the SPPA Scholastic Competence subscale loaded with the latter two of these factors and have therefore been interpreted differently. Good Conduct Competency includes the SPPA Scholastic item 'I do very well at my schoolwork'. This suggests that general perceptions of succeeding at school represent a form of good conduct competency. Mathematics/Science Competency includes the SPPA Scholastic items 'I have trouble figuring out the answers in school' and 'I feel that I am pretty intelligent'. These appear to reflect competency for general performance in mathematics and science. Interestingly, at the second-order level, the good conduct/behavioural factors are no longer associated with academic self-perception (in contrast to the individual self-concept and self-efficacy analyses), but have formed a distinct factor representing general behavioural conduct.

An important issue here relates to the level at which self-efficacy/self-concept are measured. The results reported here are consistent with Pietsch et al.'s (2003) and Skaalvik and Rankin's (1996b) findings that self-efficacy and competency-related self-concept overlap when the two constructs are measured at the same level of specificity. They also contradict Ferla et al.'s (2009) findings that the constructs do not overlap when measured at different levels. Although the MSPSE and SPPA both measure self-perceptions at a domain-specific level there are some aspects of difference in specificity within the academic subscales. The original MSPSE Academic dimension represents an omnibus measure for self-efficacies in various subject domains (e.g. How well can you learn science? How well can you learn algebra?). In contrast, the original SPPA Scholastic dimension is less structured and measures self-concept for core academic behaviours/requirements common to all students (e.g. I have trouble figuring out the answers in school). Following Ferla et al.'s findings, we would not expect these dimensions to overlap. However, these results demonstrate overlap between scholastic self-concept items and those that measure self-efficacy for mathematics/science subjects.

Like Choi et al. (2001) (but in contrast to Miller et al., 1999) there was no evidence of a clear, cross-subject academic self-efficacy factor as proposed by Bandura; consistent with the findings from the individual self-efficacy factor analysis the factors relating to academic achievement were subdivided by subject area, with separation between communication/performing arts and mathematics/science disciplines. These results support the conclusions given in the self-efficacy factor analysis discussion; there is no evidence that students have a unified representation of cross-subject self-efficacy for academic achievement, although evidence supports the idea that students have a domain-specific representation of self-efficacy for academic self-regulated learning (i.e. behaviours intended to support the achievement of academic goals generalise across subjects).

The second-order analyses indicate a hierarchical structure to self-efficacy and competency-related self-concept, with four second-order factors (see Figure 2.3, p. 101). Furthermore, there is overlap of self-efficacy and self-concept in all four factors. Skaalvik and Rankin (1996b) found that a general second-order factor explained most of the variance in their factor analyses of academic self-efficacy/competency self-concept items. As a result they argued that the traditional distinction between self-efficacy and self-concept may have been overstated. These results are consistent with their findings and support their claims. Furthermore, this study generalises their results to a wider range of domain-specific contexts. The four second-order factors reported here broadly reflect the four higher-level factors (Academic, Social, Emotional, Physical) proposed by Shavelson et al. (1976) in their hierarchical model of self-concept. Findings also to some extent reflect the three second-order self-efficacy factors demonstrated by Choi et al. (2001) and Miller at al. (1999); consistent with these authors this research demonstrates academic and social second-order factors. However, both Choi and colleagues, and Miller and colleagues found that their self-regulated learning items formed a third second-order factor (which they called Task Management Efficacy). In contrast, the second-order academic factor proposed here combines all three academic first-order factors: Communication/Performing Arts Self-Efficacy; Mathematics/Science Competency (a mixed self-concept/self-efficacy factor); *and* Self-Efficacy for Self-Regulated Learning. These results suggest that whilst there is no evidence that students have a unified representation of cross-subject self-efficacy for academic achievement at the first-order level, they do have a unified representation of cross-subject *competency* at the second-order level, i.e. self-efficacy and competency self-concept elements combine to produce a factor reflecting all aspects of academic competency.

This second-order competency structure roughly parallels the divisions created by the individual self-efficacy/self-concept extractions, although the competency structure is more differentiated. Notably, whereas generally, academic and behavioural/good conduct first-order factors loaded together in the individual self-efficacy and self-concept extractions, within the competency structure all three academic first-order factors have formed one distinct second-order academic factor, and the two good conduct first-order factors have formed another distinct factor. The greater differentiation across second-order factors in the competency structure compared to the individual extractions might result from a methodological issue; in order to get the separation, especially with younger students, it may be necessary to measure the constructs using more items. The individual factor analyses may simply have not included enough items to achieve separation of dimensions. This is consistent with Byrne's (1996) argument that higher-order analyses are only statistically possible using multiple first-order factors.

The findings reported here therefore support the idea that there is considerable conceptual overlap between self-efficacy and self-concept percepts. This suggests that when measuring these constructs at this level there may be little benefit in utilising both types of measures. First, because the concept of a single self-competency construct may be more suitable and practical than separate self-efficacy and self-concept measures. Secondly, because the ten first-order factors and four second-order factors derived from the aggregate analysis are the central areas that can be used reliably for assessment: the seven first-order factors that measure distinct aspects of self-efficacy or self-concept show higher or similar reliabilities compared to the same or similar factors from the original MSPSE/SPPA measures; the three first-order competency factors (those that share self-efficacy/self-concept elements) demonstrate higher levels of reliability than comparable factors from the original measures. Furthermore, these three first-order competency factors demonstrate higher levels of reliability than comparable factors from the individual self-efficacy/self-concept extractions; whilst the other first-order factors from the competency structure show higher or similar reliabilities (a comparison of all three first-order structures and the MSPSE and SPPA structures, together with reliabilities, is shown in Appendix A.4). The second-order competency factors can also be used reliably to assess more general aspects of competency (as opposed to self-efficacy or self-concept). These second-order factors demonstrate higher or similar reliabilities to the second-order factors derived from the individual self-efficacy/self-concept extractions. Moreover, there are additional factors: two more than the self-efficacy extraction and one more than the self-concept extraction. This allows for assessment across a wider range of contexts (a comparison of the second-order structures, with reliabilities, is also shown in Appendix A.4). A first step towards deciding what measures to use would be to undertake a confirmatory factor analysis with a large sample to determine whether the first- and second-order competency factor structures can be replicated.

The generalisability of these results inevitably depends on the selection of measurement instruments, however. Had different domain-specific measures been used, different results may have emerged. Clear conclusions cannot be made about the independence of self-efficacy/self-concept unless this study is replicated with measures other than the MSPSE and SPPA. This will help determine whether utilising *both* self-efficacy and self-concept measures is an unnecessary complication in self-perception research.

2.4.4 Implications

Determining whether self-efficacy and self-concept are distinct, and at what level they should be measured, is central to the running debate within the literature about which construct more accurately predicts performance. The utility of self-efficacy/self-concept measures for predicting outcomes is, however, based on the integrity of scores produced by instruments that have been devised using theoretical and conceptual frameworks. Any weaknesses associated with such frameworks will ultimately create issues with reliability and validity of measurement instruments and their utility for predicting outcomes will be called into question. These analyses suggest that when using the individual MSPSE and SPPA measures there should be some modifications to the original structures at least consistent with the revised self-efficacy and self-concept structures proposed here, and possibly to the extent of using the proposed competency structures, especially when using similar age-groups. The nature of the correlations between the first- and second-order factors within both the individual and aggregate analyses (Tables 2.13, 2.17 and 2.22) clearly indicates a hierarchical structure to the data. This has implications for which factor structure researchers might choose to use in their research (i.e. at the first- or second-order level of specificity). Bandura (1997) and other researchers (e.g. Pajares & Miller, 1995) have argued that prediction is optimal when the level of specificity of the self-competence assessment corresponds to the level of specificity of the target performance/outcome with which it is to be compared. This means that the first-order factors are more likely to predict approaches to learning in specific contexts. For example, Mathematics/Science Competency might be useful for predicting which university subject to study. By contrast, a more general academic competency might be better for predicting more general academic decisions. For example, the Academic Competency second-order factor, which includes the Mathematics/Science Competency first-order factor, might be better for predicting the decision to go to university. Ultimately, therefore, whether researchers choose to utilise the proposed first- or second-order structures will be dependent on the specificity of the performance to be predicted. If the goal is to predict more specific aspects of performance then it is recommended that researchers use the proposed first-order structures. If the goal is to predict more general outcomes then the second-order structures would be the most reliable.

One of the main motivations for differentiating between self-efficacy and self-concept perceptions is their temporal orientation. Whilst self-efficacy 'can' questions do not immediately appear distinct from self-concept 'being' questions, the wording of self-concept items make salient the 'past or current self' with self-concept items directing individuals towards past accomplishments (e.g. I am good..., I am hopeless…, I have done well…). Self-efficacy items, conversely, make salient the 'future self', directing the focus towards respondents' future expectancies (e.g. How confident are you that you can…? How well can you…? I am confident I will be able to…) (Bong & Skaalvik, 2003). These results suggest, however, that past- and future-orientated percepts are not distinguishable but have a sense of competency as their common core. This relates to the developmental issue discussed earlier. Perhaps at this age, because students do not have much of a past, a distinction between past- and future-oriented items is not possible. Consequently, for younger age-groups it might be better to use *self-competence* measures (i.e. competency structures created from aggregating self-concept/self-efficacy items) in order to reliably pick up global, less clearly differentiated self-competence assessments. In contrast, as a sense of an independent self develops with age, past- and future-oriented competencies might start to break down into distinct factors. Thus, distinct self-efficacy/self-concept measures might be more appropriate for older age-groups.

In summary, it appears that for middle adolescent students, perceived self-competence is a common core for self-efficacy and self-concept. This common competency element may be particularly relevant when examining predictive utility. One of the aims of the next stage of this research is, therefore, to examine what these aggregate competency structures predict and whether they give a different picture compared to distinct self-efficacy or self-concept structures.

Note:

An abridged version of this chapter has been published in the *Journal of Personality Assessment*:

Hughes, A., Galbraith, D., & White, D. (2011). Perceived competence: A common core for self-efficacy and self-concept? *Journal of Personality Assessment, 93*(3), 1-12.

The abstract and link to the paper is given in Appendix A.5.

3 DO PERCEPTIONS OF THE SELF PREDICT ACADEMIC FUNCTIONING?

3.1 Introduction

The UK education system puts an emphasis on developing self-perceptions, specifically self-esteem, in the hope that more positive self-perceptions will positively impact on students' academic performance, motivation, and other academic pursuits. Theoretically, therefore, it is important to determine whether self-perceptions do actually predict academic functioning to any great extent, in order to assess whether developing positive self-perceptions should, in fact, be a focus within academic schooling. It is also important to determine whether distinct self-efficacy and self-concept measures, or aggregate measures which combine self-efficacy and self-concept items, better predict specific outcomes. Practically, deciding which self-perception components it would be best to focus on would be advantageous in developing effective school interventions designed to promote self-efficacy and self-concept and the outcomes that they might influence. This research concentrates on three specific academic outcomes: academic performance, academic intrinsic motivation, and aspirations (educational and occupational). Henceforth, where this thesis refers to 'academic outcomes', it is referring to these three aspects of academic functioning.

As reviewed in Chapter 1, there has been a great deal of research examining the relationship between individual self-perception constructs and these aspects of academic functioning. There has, however, been very little research directly comparing the predictive utility of self-esteem, self-efficacy and self-concept in such functioning. This chapter therefore adds to previous research by exploring, within the same study, the extent to which these self-perception constructs are differentially useful for predicting academic performance, intrinsic motivation, and aspirations. Within this, the research will also examine the nature of within- and cross-domain relationships. Whilst both self-efficacy and self-concept are suggested to predict outcomes that are closely related in nature to the self-perception domain being assessed, this has not been examined across such a wide range of domains.

The second aim of the chapter is to examine whether the different structures of self-efficacy and self-concept identified in Chapter 2 vary in how well they predict academic outcomes. The new structures, which demonstrate better reliability than the original structures, will be compared with the MSPSE and SPPA to determine which structure is the best predictor. These analyses also make it possible to determine whether measures that aggregate self-efficacy and self-concept are useful for prediction.

This chapter will also examine the extent to which self-efficacy and self-concept predict self-esteem, and whether different self-perception structures have a differential impact on self-esteem. Self-efficacy is less likely to predict self-esteem because it does not contain any affective components (Bong & Clark, 1999). This begs a question, then, about the extent to which 'self-competence' measures (which are composed of both self-efficacy and self-concept components) predict self-esteem. This has not been addressed in previous research.

Finally, because academic performance is typically assessed using relatively global indices – domain-specific end-of-term grades, in this case – this chapter will also assess whether measures that correspond in specificity (i.e. the first-order domain-specific structures proposed in Chapter 2) are better predictors of these types of academic performance outcomes than are higher-order global measures (the proposed second-order structures, which combine self-perceptions across domains). As reviewed earlier, current research suggests that where the specificity of the self-perception measure is consistent with that of the achievement index being examined, it enhances prediction (Bandura, 1997; Bong & Clark, 1999).

When examining the relationship between self-perceptions and academic functioning it is important to take account of variables that might also have an effect on these outcomes. Specifically, it has been suggested that gender, socio-economic status, ability, and previous academic performance might influence the development of the outcomes considered here. For example, gender differences have been found in academic performance, motivation and aspirations (e.g. Ahmavaara & Houston, 2007; Fennena & Sherman, 1978; Feingold, 1988; Green & Foster, 1986; Litsky & Greenhaus, 2007; Skaalvik & Skaalvik, 2004b), as well as in self-perceptions (Fox, 2000; Kling, Hyde, Showers, & Buswell, 1999; Wilgenbusch & Merrell, 1999). Research has also demonstrated that general mental ability and previous academic performance are powerful predictors of academic performance and high aspirations (e.g. Chowdry, Crawford & Goodman, 2010; Shea & Howell, 2000; Chapman & Tunmer, 1997). High academic ability and good performance also help to create self-efficacy and self-concept perceptions (Pajares & Kranzler, 1994); individuals who do well are likely to feel better about themselves. A fairly consistent relationship also exists between socio-economic status and academic functioning. Socio-economic status is particularly important in academic development and is suggested to be the most important influence in student learning and aspirations toward higher education (Baharudin & Luster, 1998; Bowden & Doughney, 2010; Goodman & Gregg, 2010; Knowles, 1997; Marjoribanks, 1995, 1996; McNeal, 2001; Sirin, 2005; Walpole, 2003). Research also supports the contention that motivational patterns develop as a function of socio-economic status (e.g. Martin & McInerney, 1998; Turner & Johnson, 2003).

Hence, to the extent that gender, socio-economic status, ability and prior academic performance may be related to self-perceptions and to the outcomes under consideration here, and are also likely to influence these outcomes both directly and indirectly through their effects on self-perception judgements, they must be considered in prediction analyses; that is, they must be controlled for statistically. This is in order to determine whether the relationships between self-perceptions and academic outcomes are true and not just a function of these factors. For example, the relationship between self-perception and academic performance might be due to socio-economic status: a student might feel better about themselves because of their social advantage and be subsequently more motivated and perform better at school. The key question, therefore, is whether self-perceptions are related to academic functioning once socio-economic status and other relevant control variables have been factored out of the analyses. To support the theoretical claim that self-perceptions have an effect on academic functioning, self-perception measures should retain prediction when these determinants are controlled for.

The purpose of this chapter was therefore to examine the predictive relationship between various self-perception constructs and structures, and various academic outcomes, after controlling for gender of participant, socio-economic status, special educational needs status, past academic performance, and ability as indicated by performance on these prior academic tests. This was accomplished through the application of hierarchical multiple regression, which makes it possible to observe the effect of self-perception on relevant outcomes with the confounding influence of other variables removed from the analyses.

3.1.1 Research questions

This section of the thesis thus addresses a number of fundamental questions regarding self-concept, self-efficacy and self-esteem. The main aim was to answer the overall question: '*Do perceptions of the self predict academic functioning?*'

Within this, there are a number of sub-questions to be answered:

(1) To what extent do self-perceptions predict academic outcomes over and above the prediction based on prior academic performance and other determinants that might impact on the self-perception–outcome relationship?

(2) Which aspect of the self is the most important for predicting academic outcomes?: (a) Which of self-esteem, self-concept and self-efficacy is the better predictor of the academic outcomes? (b) Which of self-concept and self-efficacy is the best predictor of self-esteem? (c) Do academic self-perception factors predict academic outcomes better than do non-academic factors?

(3) To what extent are the self-perception structures derived from the Chapter 2 analyses valid as predictors of academic outcomes?: (a) Which structure is the better predictor? (b) Do measures that aggregate self-efficacy and self-concept items (the Competency structures) predict more strongly than distinct self-efficacy or self-concept measures? (c) Do higher-level general self-perception measures (the second-order structures) predict global indices of academic performance more strongly than do domain-specific measures (the first-order structures)?

In order to answer the questions outlined above, predictor sets of variables unique to each self-perception structure were pitted against one another in a series of hierarchical regression models. From this it was possible to determine the explanatory ability of the alternative models/structures. The objective was to see which construct/structure explained the most unique variation in the academic outcomes under consideration, and which variables/factors make an independent contribution to each structure. It was expected that after controlling for gender, socio-economic status, special educational needs, and ability/past academic performance:

(1) Self-efficacy, being more context-specific and less stable, would be the single strongest predictor of the academic outcomes, especially of academic

performance, over and above either self-concept or self-esteem. Self-esteem, being more global and stable, was hypothesised to remain the least predictive of (and less influenced by) performance.

(2) Self-concept would be a better predictor of self-esteem than would self-efficacy. In relation to self-competence measures, it was expected that because self-competence measures contain a high proportion of self-concept items, they would predict self-esteem relatively well.

(3) Academic self-perception factors would be more predictive of academic outcomes than would non-academic factors.

(4) The revised self-efficacy and self-concept structures derived from the factor analyses of the MSPSE and SPPA, having been identified as more reliable structures, would predict better than the original MSPSE and SPPA factor structures.

(5) The first-order structures would be more useful for prediction than higher-order structures (i.e. the derived second-order structures). This is because the academic performance indices used here (i.e. GCSE grades in individual subjects) are closer in specificity to the domain-specific first-order factor structures.

3.2 Method

3.2.1 Design

The overall design of the study is discussed in detail in Chapter 2. Additional aspects of specific relevance to this chapter are included with the discussion of the statistical analysis used here (presented at the end of the Method).

3.2.2 Sample

The research presented in this section of the thesis was based on the 'self-perception factor analysis' sample of 778 students. This sample has been discussed in Chapter 2. Henceforth, this will be referred to as the 'regression' sample. This is a cross-sectional dataset and as such relates to one time period.

3.2.3 Measures

A series of psychometric self-perception measures (self-efficacy, self-concept, self-esteem and self-competence) was utilised for the analyses in this chapter. Students also completed a measure of intrinsic motivation, and answered questions about their educational and occupational aspirations, and their experiences of the intervention. A range of background data were also obtained for each student from Local Education Authority records. These are discussed below.

Self-efficacy, self-concept and self-competence

In total, eight measures of self-efficacy, self-concept and self-competence were utilised. These are shown in Table 3.1. These measures have been discussed in Chapter 2. The table indicates where the relevant information for each measure can be found. All factors for each measure were included.

Individual item scores within each factor were added together and averaged to give a final score for each factor, which was used for subsequent analyses. Responses on all the factors were scored from 1 to 28, with larger scores indicating higher levels of self-perception (note: scores within this sample had previously been standardised to a 28-point scale).

Table 3.1 Summary of self-efficacy, self-concept and self-competence measures used

Measure[a]	Factors included	More information at:
MSPSE	All nine MSPSE self-efficacy factors: B1 – B9	Section 2.2.3
Self-efficacy (1)	All seven revised First-Order Self-Efficacy factors: SF1 – SF7	Section 2.3.1
Self-efficacy (2)	The two revised Second-Order Self-Efficacy factors: secSF1, secSF2	Section 2.3.1
SPPA	All eight SPPA self-concept factors: H1 – H8	Section 2.2.3
Self-concept (1)	All eight revised First-Order Self-Concept factors: SC1 – SC8	Section 2.3.2
Self-concept (2)	The three revised Second-Order Self-Concept factors: secSC1, secSC2, secSC3	Section 2.3.2
Self-competence (1)	All ten First-Order Competency factors: CY1 – CY10	Section 2.3.4
Self-competence (2)	All four Second-Order Competency factors: secCY1 – secCY4	Section 2.3.4

Note: MSPSE: *Multidimensional Scales of Perceived Self-Efficacy* (Bandura, 1990); SPPA: *Self-Perception Profile for Adolescents* (Harter, 1988). Factor codes are consistent with those presented in Chapter 2.
[a]*Structures*: (1) = First-Order; (2) = Second-Order.

Self-esteem

Self-esteem was measured using all five items of the Global Self-Worth subscale of the *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988). The items as presented to students were interspersed with the self-concept items. Piloting of the Global Self-Worth subscale was conducted at the same time as that of the self-concept subscales. The format of the Global Self-Worth items was therefore consistent with the revised format utilised for the self-concept items (see Appendix A.1). Piloting of the Global Self-Worth subscale showed that students found the items easy to understand. Therefore, it was not necessary to revise the wording.

Consistent with the self-concept items, responses were scored from 1 to 4 with larger scores indicating higher levels of self-esteem[19]. Prior to any analyses, self-esteem scores were multiplied by seven, giving a score out of 28. This was to make the final scores comparable with the 28-point self-concept scores. The scores on the five self-esteem items were then added together and averaged to give a final subscale score which was used for subsequent analyses. The internal reliability of the Global Self-Worth subscale using this sample achieved α = .79. The subscale items (showing the first item out of a given pair), with descriptive statistics, are shown in Table 3.2.

Table 3.2 The Global Self-Worth subscale of Harter's (1988) *Self-Perception Profile for Adolescents* with the subscale reliability (Cronbach's Alpha), means, and standard deviations derived using the regression sample (N = 778)

Subscale / items		α	M	SD
Global Self-Worth (gsw)		.79		
9	I am often disappointed with myself		2.80 (19.61)	1.09 (7.61)
18	I don't like the way I am leading my life		3.16 (22.12)	1.05 (7.38)
27	I am happy with myself most of the time		3.08 (21.53)	1.03 (7.20)
36	I like the kind of person I am		3.17 (22.17)	1.05 (7.37)
45	I am very happy being the way I am		3.00 (20.91)	1.13 (7.92)

Note: Means and standard deviations are given for both the 4-point scale and the 28-point scale (28-point scale in parentheses).

Academic Intrinsic Motivation

Academic intrinsic motivation was measured using the five domains (30 items) of Harter's *Scale of Intrinsic versus Extrinsic Orientation in the Classroom* (1980, 1981). This measure assesses the extent to which students are intrinsically or extrinsically motivated in school by asking them to self-report on their motivations for various classroom behaviours/activities. For example: *Preference for Challenge vs. Preference for Easy Work Assigned*. The measure employs the same 'structured alternative format' as Harter's self-concept measure (the SPPA), and previous research has shown it suffers from exactly the

[19] Of the two opposing statements, the most positive statement combined with an 'always like you' response = 4; most positive statement/sometimes like you = 3; least positive statement/sometimes like you = 2; least positive statement/always like you = 1.

same problems as the SPPA (e.g. Lepper, Corpus, & Iyengar, 2005). When used here it was therefore revised in the same way.

Consistent with Harter's formulation, responses were scored from 1 to 4 with larger scores indicating higher levels of intrinsic motivation[20]. Item scores within each subscale were totalled and averaged to give a final subscale score. Piloting of the measure resulted in a number of wording changes. These can be seen in Appendix B.1.

Assessing the structure of the motivation measure

Psychometric studies of the *Scale of Intrinsic versus Extrinsic Orientation in the Classroom* are limited although early research questions the structure (e.g. Weiss, Bredemeier, & Shewchuk, 1985). Hence, prior to the main analyses a factor analysis was undertaken on the measure (all 30 items) to determine its optimal factor structure.

Within the regression sample (N = 778) only 581 students had provided a complete set of motivation data. Therefore, in order to maximise the size of the sample for the motivation factor analysis, a separate subset of data were created from the full sample. Students' responses were included in this new sample only if they had provided a complete set of motivation data. Where available, students' baseline motivation responses were used. For control students only, where students had not provided responses at baseline, post-test responses were used, or follow-up responses were used if there were no baseline or post-test responses. For intervention students, *only* baseline responses were utilised (the reasoning for using this method of creating the factor analysis datasets has been explained in Chapter 2). The final 'motivation factor analysis' dataset was comprised of responses from 951 students (mean age = 15.07 years, SD = 0.42).

Using the motivation factor analysis sample, Harter's motivation subscales achieved internal reliabilities ranging from $\alpha = .42$ (Curiosity/Interest) to $\alpha = .71$ (Preference for Challenge). The subscales/items (reflecting the revised wording), with internal reliabilities and descriptive statistics, are shown in Table 3.3. The full measure as presented to students is shown in Appendix B.2. As can be seen from Table 3.3, the reliabilities tended to be lower than Harter's, which ranged from .78 to .84 (Challenge); .68 to .82 (Mastery); .54 to .78 (Curiosity); .72 to .81 (Judgement); and .75 to .83 (Criteria for Success). However,

[20] Of the two opposing statements, the most intrinsically oriented statement combined with an 'always like you' response = 4; most intrinsically oriented statement/sometimes like you = 3; most extrinsically orientated statement/sometimes like you = 2; most extrinsically orientated statement/always like you = 1.

Harter chose to report Kuder-Richardson Formula 20 (KR-20; Kuder & Richardson, 1937) reliabilities. These are typically used for dichotomous responses (e.g. yes-no; right-wrong; 1-0), not measures where scores fall on a continuum as is the case with this scale (Anastasi, 1982; Nunnally, 1978). Harter gave no explanation of why she chose to use this form of internal consistency. The lower reliabilities reported here are consistent with those reported by Rule and Griesemer (1996). These authors concluded that homogeneity within subscales (measured using inter-item correlations) varied in relation to their obtained (Cronbach's) coefficient alphas, thereby reducing the alphas levels compared to Harter's KR-20 reliabilities.

Table 3.3 Harter's (1980, 1981) *Scale of Intrinsic versus Extrinsic Orientation in the Classroom*, with reliabilities (Cronbach's Alphas), means, and standard deviations derived using the motivation factor analysis sample (N = 951)

Subscales / items		α	M	SD
Preference for Challenge (prefc)		.71		
1	I like hard work because it's a challenge		2.87	0.75
6	I like difficult problems because I enjoy trying to figure them out		2.65	0.99
11	I would rather just learn what I have to in school		2.79	1.16
16	I work like to go onto new work that's at a more difficult level		2.92	0.98
22	I like school subjects where it is pretty easy to just learn the answers		2.53	1.06
28	I don't like difficult school work because I have to work too hard		2.65	1.02
Independent Mastery (indm)		.66		
2	When I don't understand something right away I want the teacher to tell me the answer		2.93	0.99
8	When I make a mistake I would rather figure out the right answer by myself		2.64	1.09
15	If I get stuck on a problem I ask my teacher for help		2.38	1.09
20	I like the teacher to help me plan what to do next		2.53	1.11
24	I like to try to figure out how to do school projects on my own		2.80	1.08
29	I like to do my schoolwork without help		2.82	1.03
Curiosity/Interest (cur)		.42		
3	I work on problems to learn how to solve them		3.02	0.97
7	I do my school work only because the teacher tells me to		2.65	1.11
13	I read because I am interested in the subject		2.67	1.14
18	I ask questions in class because I want to learn new things		3.35	0.79
25	If I do extra projects it is so that I can get better grades		2.03	1.10
30	I work really hard to get good grades		1.68	0.94
Independent Judgement (indj)		.60		
4	I almost always think that what the teacher says is ok		2.69	0.97
10	I agree with the teacher because I think the teacher is right about most things		2.62	1.05
12	I like to learn things of my own choice, that interest me		3.18	1.04
17	I think that what the teacher thinks of my work is the most important		2.80	1.17
21	I think I should have a say in what work I do at school		3.20	0.96
26	I think it's best if I decide when to work on each school subject		2.67	1.12
Internal Criteria for Success (intc)		.70		
5	I know when I've made mistakes without checking with the teacher		2.58	1.03
9	I know when or not I'm doing well in school without being given marks		2.60	1.21
14	I need to get my report cards to tell me how well I'm doing in school		2.60	1.19
19	I'm not really sure if I've done well on a test until I get my paper back with a mark on it		2.13	1.15
23	I'm not sure if my work is really good or not until the teachers tell me		2.50	1.14
27	I know whether or not I did my best on a project when I turn it in		2.91	1.11

Principal factors analysis was performed on the all the 30 motivation items. Because some relationship is expected amongst motivation items, and they are therefore expected to intercorrelate (Harter, 1980, 1981) an oblique (direct oblimin) rotation with Kaiser Normalisation (Kaiser, 1958) was used (delta = 0). Consistent with the self-perception factor analyses, parallel analysis (Thompson & Daniel, 1996; Wilson & Cooper, 2008) with a criterion of 95% (O'Connor, 2000) was used to determine the number of factors to be extracted. A criterion of .30 was used for interpretation of the factor loadings, consistent with Harter's own factor analyses of the measure. Preliminary analysis indicated suitability of the motivation dataset for factorability: the initial Kaiser-Meyer-Olkin value (Kaiser, 1974) was well over the recommended value of .6 (i.e. .85); Bartlett's (1954) Test of Sphericity reached significance ($\chi^2 = 5151.02$, df = 435, $p < .000$), and there were many coefficients over .30 in the correlation matrices.

The initial PFA extracted seven factors with pre-rotational eigenvalues above 1.0, accounting for 48.18% of the total variance. Examination of the rotated pattern matrix revealed four items that did not load onto any factor in the matrix (5, 17, 18, 24). In addition, three factors contained only two or three items. Parallel analysis (O'Connor, 2000) revealed six factors with eigenvalues greater than those that might have occurred by chance, i.e. eigenvalues for the real data exceeded the eigenvalues for the randomly generated data in the first six cases. Examination of the scree plot also indicated a break at six. An additional factor analysis was therefore undertaken, constraining the factors to six and dropping the four items that did not relate in the initial analysis. This six-factor structure explained 47.72% of the total variance. Of the 26 items in the analysis one (Item 3) did not load onto any factor and has not been interpreted as part of the factor structure. In addition, three of the six factors contained only two or three items. Because these three factors achieved very low reliabilities they were also not interpreted into the factor structure[21]. The final three-factor rotated pattern matrix, percentages of variance explained, and reliabilities are presented in Table 3.4 and together explain 27.37% of the total variance. The three factors were named and are shown in Table 3.5. None of the factors match exactly any of Harter's subscales, although there were some similarities and therefore three of the original names have been retained. These three factors were used for subsequent analyses in this thesis.

[21] The first excluded factor loaded second in the matrix and was composed of Items 12, 21 and 26 ($\alpha = .52$). The second excluded factor loaded third in the matrix and was composed of Items 1, 4 and 10 ($\alpha = .38$). The third excluded factor loaded fifth in the matrix and was composed of Items 25 and 30 ($\alpha = .43$).

Table 3.4 Motivation factor analysis: Rotated pattern coefficients

Item number	Harter's Intrinsic/Extrinsic subscale	Motivation pattern matrix		
		Mot 1. Independent Mastery	Mot 2. Internal Criteria for Success	Mot 3. Preference for Challenge
15	indm	*.59*	-.02	-.04
2	indm	*.52*	.05	.13
8	indm	*.52*	-.07	-.04
6	prefc	*.39*	-.06	.22
29	indm	*.39*	-.10	-.01
14	intc	-.10	*-.67*	.03
9	intc	-.00	*-.66*	-.12
23	intc	.09	*-.61*	.10
19	intc	-.00	*-.44*	.11
27	intc	.11	*-.40*	-.03
11	prefc	-.12	-.01	*.66*
22	prefc	.22	-.05	*.46*
7	cur	.01	-.02	*.46*
28	prefc	.25	-.09	*.44*
13	cur	-.01	.00	*.43*
16	prefc	.21	-.04	*.35*
% variance explained		17.20	5.75	4.43
Reliabilities (Cronbach's)		.65	.69	.68
Mean (& standard deviation)		2.69 (0.67)	2.55 (0.78)	2.70 (0.67)

Note: Subscale codes relate to the original *Scale of Intrinsic versus Extrinsic Orientation in the Classroom* (Harter, 1980) subscales: indm–Independent Mastery; prefc–Preference for Challenge; intc–Internal Criteria for Success; cur–Curiosity/Interest.
Factor coefficients ≥ .30 are italicised.

Table 3.5 Motivation factors showing the items they are composed of and which original Intrinsic/Extrinsic Orientation subscale the items originated from

Factor name	Original subscale	Item no.	Item
Mot 1. Independent Mastery	Independent Mastery	2	When I don't understand something right away I want the teacher to tell me the answer
		8	When I make a mistake I would rather figure out the right answer by myself
		15	If I get stuck on a problem I ask my teacher for help
		29	I like to do my schoolwork without help
	Preference for Challenge	6	I like difficult problems because I enjoy trying to figure them out
Mot 2. Internal Criteria for Success	Internal Criteria for Success	9	I know when or not I'm doing well in school without being given marks
		14	I need to get my report cards to tell me how well I'm doing in school
		19	I'm not really sure if I've done well on a test until I get my paper back with a mark on it
		23	I'm not sure if my work is really good or not until the teachers tell me
		27	I know whether or not I did my best on a project when I turn it in
Mot 3. Preference for Challenge	Preference for Challenge	11	I would rather just learn what I have to in school
		16	I work like to go onto new work that's at a more difficult level
		22	I like school subjects where it is pretty easy to just learn the answers
		28	I don't like difficult school work because I have to work too hard
	Curiosity / Interest	7	I do my school work only because the teacher tells me to
		13	I read because I am interested in the subject

Note: Item numbers are as the original *Scale of Intrinsic versus Extrinsic Orientation in the Classroom* (Harter, 1980) subscales.

Aspirations

Two types of aspirations were assessed: long-term educational aspirations and occupational aspirations.

Long-term educational aspirations were measured by asking students to provide their anticipated highest level of educational/practical training. Students responded to a range of options from 1 = *leave school without getting any qualifications* to 5 = *attend university*, with 5 being the highest level of educational aspiration.

Occupational aspirations were measured using one open-ended question that asked students for the name of the job that they hoped to end up in (see Appendix B.3). Responses were then coded using the Standard Occupation Classification 2000 (SOC2000), an electronic database compiled by the Office for National Statistics (ONS)[22]. The SOC2000 classifies jobs in terms of their skill level and skill content and is used by Government departments and agencies responsible for the processing of occupational data. The SOC2000 has been devised as a system of major, sub-major, minor, and unit groupings which have been given discrete classifications with units coded using a number somewhere between 1 and 9259, with 1 representing the highest occupational level. For the purposes of the analyses an additional unit was included (unemployment benefit; coded as 9999).

The SOC2000 codes were subsequently recoded according to the National Statistics Socio-Economic Classification (NS-SEC) which has been used since 2001 for all official statistics and surveys. This is an occupationally based classification that requires occupation to be assigned according to SOC2000 unit codes. The NS-SEC User Manual and the derivation tables for SOC2000/NS-SEC conversion can be found on the ONS website[23]. There are three methods to derive the functional categories of the NS-SEC ('full', 'reduced', 'simplified'). The simplified method was utilised here which allows for classification when additional details of employment status (e.g. size of organisation; supervisory status) have not been provided. There are also two types of derivation tables ('Operational' and 'Analytic'). The 'Analytic Classes' version was used here; this has

[22] The database and all relevant information can be found at http://www.ons.gov.uk/about-statistics/classifications/archived/SOC2000/index.html

[23] *NS-SEC User Manual*: http://www.statistics.gov.uk/methods_quality/ns_sec/downloads/NS-SEC_User_2005.pdf. *NS-SEC derivation tables*: http://www.ons.gov.uk/about-statistics/classifications/current/ns-sec/deriving/derivation-tables/index.html

eight occupation classes, the first of which is further subdivided into two classes. Class 8 represents the lowest occupational level. To make interpretation easier the data were reclassified into nine classes. The data were also reverse-coded such that 1 represented the lowest occupational level, i.e. 1 = *never worked and long-term unemployed* and 9 = *large employers and higher managerial occupations*. This 9-point measure was used for all subsequent analyses. The eight-class NS-SEC ‘Analytic’ codes and how they map on to the nine-class codes are shown in Appendix B.4.

Academic performance

Academic performance was measured using mathematics, English and science scores on two types of National Curriculum assessments – Key Stage 3 (Year 9) SAT scores and Year 11 GCSE scores. These data were obtained from central records held by the Local Education Authority.

Prior academic performance was based on Key Stage 3 SATs, which are typically taken near the end of Year 9 (aged 13.0 – 14.0 years). They are therefore taken one year prior to the intervention and as such are appropriate as a measure of prior academic performance. Because these tests are standardised against the National average, they are also appropriate as a measure of ability. Year 9 SAT scores assess students’ progress and development in core subjects, i.e. mathematics, English and science. ‘Decimalised’ SAT scores were used here: these draw on the same assessment data and weightings as the more typical banded scores, but allow for graduation within each band. The decimalised scores ranged from 2.00 to 8.43 across the three subjects, with larger scores indicating the highest level of ability.

Outcome academic performance was based on GCSE assessments taken at the end of Year 11 (aged 15.0 – 16.0 years). For the purposes of this study the grades were converted to numeric scores such that: A* = 8, A = 7, B = 6, C = 5, D = 4, E = 3, F = 2, G = 1, U or X = 0. GCSE Mathematics, English and Science grades were used. The score for English Language was used except in cases where no English Language score was available, in which case the English Literature score was used. Where students took more than one type of Science GCSE then the mean of these scores was used.

Socio-economic status and special educational need

These data were obtained from Local Authority central records. Free school meal and ACORN scores were used as socio-economic proxies. These and a measure of special educational need (SEN) were held as covariates in the analyses (i.e. they were treated as control variables). Free school meal and special educational needs indicators were coded such that 1 = *'yes' (the student has that attribute)* and 0 = *'no' (the student does not have that attribute)*. The ACORN classification ranges from 1 to 56 with larger scores indicating the lowest level of socio-economic status. To make interpretation easier, ACORN scores were 'reverse-coded' so that 56 indicated the *highest* level of socio-economic status. For the analyses in this chapter scores were then recoded into categories such that 17 and below = *low socio-economic status*; 18 to 36 = *medium socio-economic status*; and 37 and above = *high socio-economic status*.

3.2.4 Procedure

The procedure has been discussed in Chapter 2.

3.2.5 Statistical analysis

The hypotheses were tested using a series of hierarchical multiple regression analyses. The analyses were conducted using STATA Data Analysis and Statistical Software (StataCorp, 2009). To answer the research questions nine outcomes were examined. Eight of these were academic outcomes: (a) one indicator of educational aspiration; (b) one indicator of occupational aspiration[24]; (c) three indicators of intrinsic motivation (Independent Mastery, Internal Criteria for Success, Preference for Challenge); and (d) three indicators of GCSE performance (Mathematics, English, Science). In order to determine whether self-efficacy and self-concept predict overall self-esteem, self-esteem was included as an additional outcome measure.

Regression analysis was used to examine the utility of various self-perception structures for predicting the nine outcomes. In total, the predictive utility of 12 separate self-perception structures was examined. Details of these structures are shown in Table 3.6. Seven 'single-construct' structures were examined: the four single-construct structures derived from the factor analyses in Chapter 3 (i.e. Structures 2, 3, 5 and 6), the original

[24] Occupational aspirations are not actually an 'academic' outcome but have been suggested to be related to academic and emotional development in school, therefore for ease of reference will be termed as such here.

MSPSE and SPPA structures, and a Self-Esteem structure[25]. In addition five 'aggregate-construct' structures were examined. Two were derived from the factor analyses in Chapter 3, i.e. the First- and Second-Order Competency structures (Structures 8 and 9). As these were derived from an aggregate factor analysis of MSPSE and SPPA items, a number of other aggregate structures were also tested to see how well they predicted in combination, in comparison to the competency structures. These were Structure 10 (which combined the original MSPSE and SPPA structures); Structure 11 (which combined the First-Order Self-Efficacy and First-Order Self-Concept structures); and Structure 12 (which combined the Second-Order Self-Efficacy and Second-Order Self-Concept structures).

Table 3.6 Summary of self-perception structures

Code	Structure[a]	Factors included
Single-construct structures:		
1	MSPSE	All nine MSPSE self-efficacy factors: B1 – B9
2	Self-Efficacy (1)	All seven revised First-Order Self-Efficacy factors: SF1 – SF7
3	Self-Efficacy (2)	The two revised Second-Order Self-Efficacy factors: secSF1, secSF2
4	SPPA	All eight SPPA self-concept factors: H1 – H8
5	Self-Concept (1)	All eight revised First-Order Self-Concept factors: SC1 – SC8
6	Self-Concept (2)	The three revised Second-Order Self-Concept factors: secSC1, secSC2, secSC3
7	Self-Esteem	The SPPA Global Self-Worth subscale
Aggregate-construct structures:		
8	Competency (1)	All ten First-Order Competency factors: CY1 – CY10
9	Competency (2)	All four Second-Order Competency factors: secCY1 – secCY4
10	MSPSE / SPPA	All nine of the MSPSE self-efficacy factors and all eight of the SPPA competence factors: B1 – B9 *and* H1 – H8 (17 factors in total)
11	Self-Efficacy (1) / Self-Concept (1)	The seven First-Order Self-Efficacy factors and the eight First-Order Self-Concept factors: SF1 – SF7 *and* SC1 – SC8 (15 factors in total)
12	Self-Efficacy (2) / Self-Concept (2)	The two Second-Order Self-Efficacy factors and the three Second-Order Self-Concept factors: secSF1, secSF2 *and* secSC1, secSC2, secSC3 (five factors in total)

Note: MSPSE: *Multidimensional Scales of Perceived Self-Efficacy* (Bandura, 1990); SPPA: *Self-Perception Profile for Adolescents* (Harter, 1988). Factor codes are consistent with those presented in Chapter 3.
[a]*Structures*: (1) = First-Order; (2) = Second-Order.

A series of separate three-stage hierarchical regression models were carried out to test the relation of each outcome to each self-perception structure. One or another of the outcomes was entered as the dependent variable in the model and the factors representing each self-perception structure were entered as predictors. A number of covariates, or 'control' variables were also included as predictors in each model, i.e. they were controlled for statistically in the analyses. Hence, in *Step 1* the relevant outcome was regressed against five control variables (gender, free school meals, special educational needs, low ACORN

[25] Although the Self-Esteem structure is examined by only one subscale it is termed a 'structure' for ease of reference.

score, and high ACORN score[26]). In *Step 2* three prior academic performance variables (KS3 Mathematics, English and Science) were added into the regression model. The addition of prior academic performance in Step 2 served as a second level of statistical control; the aim was to determine whether these additional variables added anything to the model over and above the five control variables in Step 1. In *Step 3* the relevant self-perception factors were added into the model. The number of factors added in at this stage was dependent on the self-perception structure used. For example, one factor was added in for the Self-Esteem structure, whereas nine factors were added in for the MSPSE structure. An overview of the models is shown in Table 3.7. Note that, depending on which analyses were being conducted, self-esteem was used both as an outcome and as a predictor in different models.

Table 3.7 Overview of the regression models

Regression models	
Predictor variables (independent variables)	**Outcomes (dependent variables)**
Step 1: *Control variables (all five)*	*Self-esteem*
Male	*Aspiration variables*
Free school meals	Educational aspirations
Special Education Needs	Occupational aspirations
Low ACORN score	*Motivation variables*
High ACORN score	Mot 1: Independent Mastery
Step 2: *Prior academic performance variables (all three)*	Mot 2: Internal Criteria for Success
KS3 Mathematics	Mot 3: Preference for Challenge
KS3 English	*GCSE performance*
KS3 Science	GCSE Mathematics
Step 3:	GCSE English
Self-perception structure (one of 12; see Table 3.6)	GCSE Science

Note: ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

In total, 108 regression models were derived. Hierarchical linear regression (ordinary least squares estimation; OLS) was used to estimate all the regression models. Hierarchical regression was conducted using the 'nestreg: regress' command in STATA. Where analyses included GCSE performance variables they were based only on data provided by control students. This is because intervention students' self-perception and GCSE performance may have been influenced by the effects of the intervention which was presented to students after collection of the first set of self-perception data, but before GCSE exams were taken (the intervention is discussed in more detail in Chapter 4).

The aim of Step 3 of the model was to determine three things: (1) whether the model as a whole was significant, (2) how much proportion of the total variance (R^2) within the

[26] Medium ACORN score was held as the 'reference case' for comparison.

sample was explained by the model over and above that explained at Steps 1 and 2, and (3) the amount of error demonstrated by the model within the sample. By comparing the R^2 change from Step 2 to Step 3 across self-perception models/structures it is possible to determine which self-perception structure or construct best predicts the academic outcomes in question – the highest R^2 change from Step 2 to Step 3 across structures indicates the optimal model/structure. The significance of R^2 change is demonstrated by the F change probability. Adjusted R^2 values were reported here as they allow for the number of predictors in each model[27]. To reduce the possibility of Type I errors due to testing multiple structures a Bonferroni adjustment was made to the alpha levels. The simplest method of adjustment was used here, i.e. the usual criterion for alpha was divided by twelve (the number of structures to be compared)[28]. Therefore, the usual alpha criterion of .05 was adjusted to .0042; the usual alpha criterion of .01 was adjusted to .0008; and the usual alpha criterion of .001 was adjusted to .00008. Results were considered to be significant only if the probability of the model and the R^2 change (F change) probabilities were less than these new adjusted alpha values.

The validity of the models can also be compared by examining the amount of error in the model, i.e. examining the *root mean square error* value (RMSE; also known as the *standard error of the estimate*). Root mean square error is a measure of how well the model fits the data overall. It is a measure of accuracy of the prediction of the model and shows the relative error of the predicted values within the model in relation to the observed values. It therefore indicates the absolute fit of the model to the data. The R^2 value, by contrast, is a measure of relative fit which does not take into account how much the mean is predicting within the model (Pindyck & Rubinfeld, 1998). The RMSE is derived from the square root of the variance of the residuals and as such can be interpreted as the standard deviation of the unexplained variance. It is expressed in the same units as the dependent variable. The lower the RMSE value, the better the model fits the data. It has

[27] R^2 increases as predictors are added to the regression model. However, this increase is actually artificial when the predictors are not actually improving the fit of the model. Adjusted R^2 therefore corrects the model relative to the number of predictors used (Allison, 1999).

[28] A Type 1 error is the probability of falsely rejecting the null hypothesis when it is actually true, i.e. believing that there is a genuine effect, when in fact there is not. A Bonferroni adjustment is a correction applied to the alpha level to control the Type I error rate when multiple comparisons are undertaken. The simplest method of correction uses the normal criterion for significance (i.e. .05, .01, or .001) divided by the number of tests conducted. This method tends to be too strict when lots of tests are performed, however, and could increase the probability of rejecting an effect that does actually exist (a Type II error) (Field, 2009).

been suggested that the RMSE is the most important criterion for determining the fit of a model if the main purpose is prediction, as is the case here (Pindyck & Rubinfeld, 1998).

As the RMSE is measured in the same units as the dependent variable, determining the RMSE change between Step 2 and Step 3 demonstrates how much more or less error the self-perception structure explains in real terms; GCSE grades or motivation scores, for example. For the model to provide a better fit to the data at Step 3 – following addition of the self-perception variables – we would be looking for a reduction in the RMSE value from Step 2 to Step 3, rather than an increase (i.e. we are looking for values to be negative rather than positive). For the purposes of this study the RMSE difference between steps of the regression is termed the 'RMSE change'. Comparing the RMSE change value across models/structures indicates the optimal model – the lowest RMSE change from Step 2 to Step 3 across structures indicates the best structure for prediction. When comparing regression models with the same dependent variables, the RMSE will go down as the adjusted R^2 value goes up. The RMSE and R^2 values are both produced as part of STATA 'nestreg: regress' regression output.

3.2.6 Diagnostic checks

Prior to the main analyses a number of diagnostic checks were run on the data to determine whether any assumptions were violated. In addition to the checks for normality (skewness and kurtosis) that are discussed in Chapter 2, the regression data were also checked for sample size requirements (ratio of predictors to number of participants); outliers, multicollinearity and singularity; and normality, linearity and homoscedasticity of the residuals. These are collectively summarised in Appendix B.5. The diagnostic checks were satisfactory and therefore no adjustments were made to the data. There was evidence of heteroscedasticity in a few of the variables. Heteroscedasticity causes standard errors to be biased. Therefore, following the recommendations of Allison (1999), robust standard errors were reported here for all the regressions, instead of the default standard errors.

3.3 Results

3.3.1 Descriptive statistics

The means, standard deviations and raw correlations for the study variables are shown in Appendix B.6 (Tables B.6.1, B.6.2 and B.6.3).

Table B.6.1 presents the means and standard deviations for the nine outcome measures. Prior academic performance scores averaged around 5.5 for each of KS3 Mathematics, English and Science (out of a maximum decimalised SAT score of 8.4, 7.6 and 7.5 respectively). GCSE scores averaged around 4 (3.9 for Mathematics, 4.3 for English, 4.0 for Science), out of a possible maximum score of 8. Mean GCSE scores were therefore low, being equivalent to a 'D' grade. The distribution of scores showed that a moderate number of students achieved a Level 2 GCSE pass, i.e. an A* to C grade (43% for Mathematics; 47.8% for English; 40.2% for Science). These results were low compared to the National average for the same year (i.e. National provisional results for June 2005 were 53.4% for Mathematics; 59.9% for English; 57.2% – 88.2% for Science). Students' intrinsic motivation was relatively high for all three indicators; the lowest of the three means was over the mid-point, i.e. 2.6 on a 4-point scale. Mean self-esteem was also over the mid-point (3.04 on the 4-point scale / 21.27 on the 28-point scale), indicating that, in the main, students' felt pretty good about themselves. Aspiration indicators were also high. The educational aspirations mean was 3.92 (on a 5-point scale) and 67.7% of respondents aspired to an A level or higher educational level. Only 16.8% did not look to progress past taking their GCSEs (with only 1.3% of students intending to leave school with no qualifications). The occupational aspirations mean was 6 (on a 9-point scale), and 66.4% of students aspired to at least an intermediate level occupation (e.g. laboratory assistant, air travel assistant, computer engineer, legal associate professional, dispensing optician). Only 11.4% 'aspired' to lower level occupations (or did not intend to work at all – this was only one half a percent).

The means and standard deviations for the self-perception variables are shown in Table B.6.2. Two types of mean indicator are shown: the original scale (1 – 4 for self-concept and self-esteem, and 1 – 7 for self-efficacy), and the 28-point scale. All self-perception scores were relatively high overall, which suggests both that students felt generally good about themselves, and were largely confident in their abilities. Self-efficacy scores ranged from 17.06 to 23.02 (4.27 and 5.75 on the 7-point scale), and self-concept scores ranged from 17.47 to 23.62 (2.50 and 3.37 on the 4-point scale) (these figures take account of individual self-efficacy and self-concept factors within the First-Order Competency structure). Competency scores ranged from 18.10 to 22.67 (using CY2, CY8, CY10 and all four second-order competency factors). The average self-efficacy score was 19.60, the average self-concept score was 20.60, and the average competency score was 19.68.

Students therefore exhibited very slightly higher levels of self-concept than self-efficacy or self-competence. Self-esteem was slightly higher still at 21.27.

3.3.2 Regression analyses

All together 108 hierarchical regression models were examined, using the self-perception factors as independent variables and one or another of the outcomes as the dependent variable. Analyses were conducted once allowing for the clustered nature of the data (students are not independent of each other, but are grouped together by attendance at different schools), and again not allowing for clusters. However, STATA was unable to calculate all the cluster robust statistics[29], therefore non-cluster robust results are reported here.

The analytic strategy for the regression results involved comparing the adjusted R^2 and RMSE values across self-perception structures for each outcome separately. Decisions about the optimal model for each of the analyses were based on identifying the model that maximised the adjusted R^2 and minimised the RMSE. Full details of the model summary results for these comparisons are presented in Appendix B.7 (Tables B.7.1 – B.7.9). The adjusted R^2 and RMSE change values for each self-perception model/structure are summarised and compared in Table 3.8. This is to facilitate a comparison of the predictive capability of each model/structure for each outcome. The unstandardised and standardised coefficients are presented in Appendix B.8, together with the robust standard errors. The variables/factors which make an independent contribution to each model are summarised in Tables 3.9 to 3.11. For all the self-perception structures, five control variables were entered into the model at *Step 1*: gender, free school meals, special educational needs, and high and low ACORN. Prior performance (the three separate KS3 indices of Mathematics, English and Science) was entered at *Step 2*. The self-perception factors relative to each structure were then added in at *Step 3*. The results for each outcome are discussed below.

[29] The cluster robust analyses failed to produce F values or the associated probabilities for all the models examined. This was likely to be due to either an insufficient number of clusters or an excessive number of explanatory variables in the model (Nichols & Schaffer, 2007; also STATA Online Resource Classes, Class 3: Estimation: http://web.missouri.edu/~kolenikovs/stata/Duke/class3.html). However, the adjusted R^2 and RMSE values were similar for the robust and cluster robust analyses, and both sets produced comparable significant explanatory variables.

Table 3.8 Comparison of adjusted R^2 change and RMSE change values across models/structures following addition of prior academic performance and self-perception variables

Step / Structures		Adjusted R^2 change and RMSE change values (RMSE change values in parentheses)								
		Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
Step 1 to Step 2: Adding prior academic performance[a]		-.001 (+0.003)	.175*** (-0.108)	.083** (-0.081)	.078*** (-0.027)	.071*** (-0.030)	.028*** (-0.014)	.582*** (-0.628)	.627*** (-0.569)	.527*** (-0.547)
Step 2 to Step 3: Adding self-perception variables										
Structure[b]										
1	MSPSE	.193*** (-0.574)	.066*** (-0.043)	**.039**** *(-0.035)*	.147*** (-0.054)	.042* (-0.018)	.257*** (-0.098)	.025* (-0.035)	.013 (-0.016)	.050*** (-0.068)
2	Self-Efficacy (1)	.183*** (-0.542)	.056*** (-0.037)	.024 (-0.022)	.146*** (-0.054)	.042** (-0.018)	.239*** (-0.088)	.022** (-0.032)	.012 (-0.014)	.049*** (-0.066)
3	Self-Efficacy (2)	.155*** (-0.457)	.047*** (-0.031)	.019* (-0.017)	.117*** (-0.043)	.032*** (-0.014)	.196*** (-0.071)	.015* (-0.022)	.010* (-0.011)	.039*** (-0.052)
4	SPPA	.497*** (-1.655)	.040*** (-0.026)	.014 (-0.012)	.098*** (-0.036)	.046** (-0.020)	.154*** (-0.055)	.010 (-0.014)	.009 (-0.011)	.036*** (-0.048)
5	Self-Concept (1)	.474*** (-1.565)	.039*** (-0.026)	.013 (-0.011)	.101*** (-0.036)	.044** (-0.019)	.149*** (-0.053)	.010 (-0.015)	.012 (-0.014)	.038*** (-0.051)
6	Self-Concept (2)	.387*** (-1.232)	.038*** (-0.025)	.013 (-0.012)	.099*** (-0.036)	.033** (-0.014)	.141*** (-0.050)	.013 (-0.019)	.008 (-0.009)	.038*** (-0.050)

Table continued over the page…

Table 3.8 continued…

		Adjusted R^2 change and RMSE change values (RMSE change values in parentheses)								
		Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
7	Self-Esteem	-	.001 (-0.001)	.000 (-0.000)	.016 (-0.005)	.007 (-0.003)	.005 (-0.001)	.003 (-0.005)	.001 (-0.000)	.006 (-0.007)
8	Competency (1)	.477*** (-1.577)	.067*** (-0.044)	.031 (-0.028)	**.172***** *(-0.064)*	.049** (-0.021)	.259*** (-0.097)	.021* (-0.030)	**.017*** *(-0.020)*	**.062***** *(-0.084)*
9	Competency (2)	.376*** (-1.191)	.065*** (-0.043)	.025* (-0.022)	.163*** (-0.060)	.052*** (-0.022)	.229*** (-0.084)	.011 (-0.017)	.010 (-0.009)	.038*** (-0.050)
10	MSPSE / SPPA	**.502***** *(-1.675)*	**.074***** *(-0.049)*	**.039*** *(-0.035)*	.168*** (-0.062)	**.053**** *(-0.023)*	**.292***** *(-0.110)*	**.026** *(-0.038)*	.014 (-0.016)	.059*** (-0.080)
11	Self-Efficacy (1) / Self-Concept (1)	.476*** (-1.573)	.064*** (-0.042)	.023 (-0.021)	.168*** (-0.062)	**.053**** *(-0.023)*	.268*** (-0.100)	.020* (-0.029)	.016 (-0.019)	.057*** (-0.077)
12	Self-Efficacy (2) / Self-Concept (2)	.398*** (-1.274)	.061*** (-0.040)	.019 (-0.017)	.152*** (-0.056)	.039** (-0.016)	.223*** (-0.082)	.017* (-0.025)	.010 (-0.011)	.050*** (-0.067)

Note: Values in bold/italics indicate the structures that explain the most additional variance/most error reduction overall: values in bold indicate the highest adjusted R^2 change; values in italics indicate the greatest reduction in error. Bonferonni corrections have been applied to the criterion for significance of the F change (R^2 change) such that typical criterions have been divided by the number of structures examined (i.e. 12). Educ asps–Educational aspirations. Occup asps–Occupational aspirations. Mot 1–Independent Mastery; Mot 2–Internal Criteria for Success; Mot 3–Preference for Challenge.

[a]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[b]*Structures*: (1) = First-Order; (2) = Second-Order.

*F change significant at $p < .0042$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **F change significant at $p < .0008$ (equivalent to a pre-Bonferroni criterion of $p < .01$). ***F change significant at $p < .00008$ (equivalent to a pre-Bonferroni criterion of $p < .001$).

Table 3.9 The single-construct domain-specific (first-order) self-efficacy and self-concept structures, and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients

Outcome	Structure			
	MSPSE (self-efficacy)	**First-Order Self-Efficacy**	**SPPA (self-concept)**	**First-Order Self-Concept**
Self-esteem	Gender (male) (.18**) Self-Efficacy to Meet Others' Expectations (.25**) Self-Assertive Efficacy (.15*)	Gender (male) (.13*) Self-Assertive Efficacy (.21*) Social Self-Regulatory Efficacy (.19**)	*Scholastic Competence (.15**)* *Social Acceptance (.15**)* *Physical Appearance (.49**)* *Behavioural Conduct (.21**)*	Scholastic Competence (.17*) Social Acceptance (.15*) Physical Appearance (.53**) Behavioural Conduct (.15**)
Educational aspirations	*Self-Efficacy for Academic Achievement (.19**)*	Mathematics/Science Self-Efficacy (.18*)	Scholastic Competence (.17**) Physical Appearance (.12*)	Scholastic Competence (.18**)
Occupational aspirations	*KS3 English (.19*)* *Self-Efficacy in Enlisting Social Resources (-.19*)*	None	None	None
Independent Mastery Motivation	*Self-Efficacy for Academic Achievement (.20*)* *Self-Efficacy for Self-Regulated Learning (.26**)*	Self-Efficacy for Self-Regulated Learning (.24**) Mathematics/Science Self-Efficacy (.23**)	Scholastic Competence (.23**) Behavioural Conduct (.17**)	Behavioural Conduct (.17**)
Internal Criteria for Success Motivation	*None*	None	*Scholastic Competence (.18*)*	Scholastic Competence (.18*)
Preference for Challenge Motivation	*Self-Efficacy for Academic Achievement (.17*)* *Self-Efficacy for Self-Regulated Learning (.44**)* *Self-Regulatory Efficacy (.13*)*	Self-Efficacy for Self-Regulated Learning (.43**)	Scholastic Competence (.20**) Job Competence (.13*) Behavioural Conduct (.25**)	Scholastic Competence (.22**) Behavioural Conduct (.26**)
GCSE Mathematics	*Low ACORN (-.11*)* *KS3 Mathematics (.67**)*	Low ACORN (-.12**) KS3 Mathematics (.65**) Communication/Performing Arts Self-Efficacy (-11*)	Low ACORN (-.12**) KS3 Mathematics (.65**)	Low ACORN (-.12**) KS3 Mathematics (.66**)
GCSE English	*Gender (male) (-.11**)* *KS3 English (.47**)* *KS3 Science (.23**)*	Gender (male) (-.12**) KS3 English (.46**) KS3 Science (.25**)	Gender (male) (-.11*) KS3 English (.48**) KS3 Science (.24**) Scholastic Competence (.10*)	Gender (male) (-.11*) KS3 English (.47**) KS3 Science (.24**) Scholastic Competence (.11*)
GCSE Science	*KS3 Mathematics (.20**)* *KS3 Science (.50**)* *Self-Efficacy for Self-Regulated Learning (.23**)*	KS3 Mathematics (.17*) KS3 Science (.50**) Self-Efficacy for Self-Regulated Learning (.22**) Communication/Performing Arts Self-Efficacy (-15**)	KS3 Science (.54**) Behavioural Conduct (.15**)	KS3 Science (.53**) Behavioural Conduct (.15**)

Note: Italicised cells indicate the optimal model for prediction out of these four models (see Table 3.8 for the adjusted R^2 change and RMSE change values appropriate to each model).
*Indicates significance at $p < .0042$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Indicates significance at $p < .0008$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table 3.10 The self-esteem and aggregate domain-specific (first-order) structures, and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients

Outcome		Aggregate structure		
	Self-Esteem	**First-Order Competency**	**MSPSE/SPPA**	**First-Order Self-Efficacy/Self-Concept**
Self-esteem	n/a	Friendship Self-Concept (.11*) Physical Appearance Self-Concept (.51**) Good Conduct Competency (.27**)	*Self-Efficacy to Meet Others' Expectations (.14**)* *Scholastic Competence (.13**)* *Social Acceptance (.16**)* *Physical Appearance (.47**)* *Behavioural Conduct (.18*)*	Communication/Performing Arts Self-Efficacy (-.07*) Scholastic Competence (.17**) Physical Appearance (.52**) Behavioural Conduct (.13*)
Educational aspirations	Not significant	Mathematics/Science Competency (.17*)	*Self-Efficacy for Academic Achievement (.19*)*	Mathematics/Science Self-Efficacy (-.16*)
Occupational aspirations	.13*	KS3 English (.20*) Mathematics/Science Competency (.22*)	*KS3 English (.19*)* *Self-Efficacy in Enlisting Social Resources (-.19*)*	KS3 English (.19*)
Independent Mastery Motivation	Not significant	*Self-Efficacy for Self-Regulated Learning (.17*)* *Mathematics/Science Competency (.22**)*	Self-Efficacy for Academic Achievement (.18*) Self-Efficacy for Self-Regulated Learning (.19*)	Mathematics/Science Self-Efficacy (.20*)
Internal Criteria for Success Motivation	Not significant	None	*None*	None
Preference for Challenge Motivation	Not significant	Self-Efficacy for Self-Regulated Learning (.36**) Good Conduct Competency (.14*)	*Self-Efficacy for Academic Achievement (.19*)* *Self-Efficacy for Self-Regulated Learning (.39**)* *Job Competence (.12*)*	Self-Efficacy for Self-Regulated Learning (.37**) Behavioural Conduct (.13*)
GCSE Mathematics	Not significant	Low ACORN (-.12**) KS3 Mathematics (.64**)	*Low ACORN (-.11*)* *KS3 Mathematics (.67**)* *Self-Assertive Efficacy (-.12*)*	Low ACORN (-.12*) KS3 Mathematics (.65**) Communication/Performing Arts Self-Efficacy (-.11*)
GCSE English	Not significant	*Gender (male) (-.11*)* *KS3 English (.46**)* *KS3 Science (.26**)* *Self-Efficacy for Self-Regulated Learning (.14*)*	Gender (male) (-.12*) KS3 English (.47**) KS3 Science (.22**)	Gender (male) (-.10*) KS3 English (.46**) KS3 Science (.25**) Job Self-Concept (-.09*)
GCSE Science	Not significant	*KS3 Mathematics (.17*)* *KS3 Science (.52**)* *Self-Efficacy for Self-Regulated Learning (.20*)* *Communication/Performing Arts Self-Efficacy (-.16*)* *Good Conduct Competency (.14**)*	KS3 Mathematics (.18*) KS3 Science (.50**) Self-Efficacy for Self-Regulated Learning (.21*) Self-Efficacy for Leisure-Time Skills & Extracurricular Activities (-.12*)	KS3 Mathematics (.16*) KS3 Science (.49**) Communication/Performing Arts Self-Efficacy (-.14**)

Note: Self-Esteem is a single-factor structure. Italicised cells indicates the optimal model for prediction overall (i.e. out of all the 12 structures) (see Table 3.8 for the adjusted R^2 change and RMSE change values appropriate to each model).
*Indicates significance at p < .0042 (equivalent to a pre-Bonferroni criterion of p < .05). **Indicates significance at p < .0008 (equivalent to a pre-Bonferroni criterion of p < .01).

Table 3.11 The second-order structures, and the variables/factors that make a significant independent contribution to each model, with standardised (beta) coefficients

Outcome	Structure			
	Single-construct structures		Aggregate structures	
	Second-Order Self-Efficacy	Second-Order Self-Concept	Second-Order Competency	Second-Order Self-Efficacy/Self-Concept
Self-esteem	Gender (male) (.16**) Academic & Self-Management Efficacy (.27**) Social Self-Efficacy (.19**)	Scholastic & Behavioural Self-Concept (.45**) Physical Self-Concept (.32**) Social Self-Concept (.18**)	Behavioural Conduct Competency (.25**) Sports & Physical Appearance Competency (.47**) Social Competency (.17**)	Academic & Self-Management Efficacy (.14*) Social Self-Efficacy (-.16*) Scholastic & Behavioural Self-Concept (.52**) Physical Self-Concept (.26**) Social Self-Concept (.15**)
Educational aspirations	Academic & Self-Management Efficacy (.23**)	Physical Self-Concept (.22**)	Academic Competency (.28**) Sports & Physical Appearance Competency (-.11*)	Scholastic & Behavioural Self-Concept (-.14*)
Occupational aspirations	None	Physical Self-Concept (.14*)	None	None
Independent Mastery Motivation	KS3 Mathematics (.22*) Academic & Self-Management Efficacy (.33**)	Physical Self-Concept (.35**)	Gender (male) (.18**) Academic Competency (.39**)	Gender (male) (.14*) Academic & Self-Management Self-Efficacy (.20**) Physical Self-Concept (.22**)
Internal Criteria for Success Motivation	Social Self-Efficacy (.15*)	None	Academic Competency (.19**)	None
Preference for Challenge Motivation	Academic & Self-Management Efficacy (.49**)	Physical Self-Concept (.41**)	Academic Competency (.37**) Behavioural Conduct Competency (.24**)	Academic & Self-Management Self-Efficacy (.36**) Physical Self-Concept (.22**)
GCSE Mathematics	Low ACORN (-.12**) KS3 Mathematics (.67**) Academic & Self-Management Efficacy (.16**)	Low ACORN (-.12**) KS3 Mathematics (.66**)	Low ACORN (-.12*) KS3 Mathematics (.65**)	Low ACORN (-.12**) Academic & Self-Management Self-Efficacy (.12*)
GCSE English	Gender (male) (-.11**) KS3 English (.47**) KS3 Science (.23**)	KS3 English (.46**) KS3 Science (.24**)	Gender (male) (-.11*) KS3 English (.48**) KS3 Science (.24**)	Gender (male) (-.10*) KS3 English (.46**) KS3 Science (.23**)
GCSE Science	KS3 Mathematics (.17*) KS3 Science (.50**) Academic & Self-Management Efficacy (.25**)	KS3 Mathematics (.15*) KS3 Science (.52**) Physical Self-Concept (.20**)	KS3 Mathematics (.16*) KS3 Science (.52**) Behavioural Conduct Competency (.17**)	KS3 Mathematics (.16*) KS3 Science (.49**) Academic & Self-Management Efficacy (.19**) Social Self-Efficacy (-.12*) Physical Self-Concept (.12*)

*Indicates significance at $p < .0042$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Indicates significance at $p < .0008$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Self-esteem

Table B.7.1 (Appendix B.7) shows the regression results for self-esteem. At Step 1, gender, free school meals, special educational needs, and high and low ACORN explained 4.9% of the variance in self-esteem in total. The only significant predictor in the model was gender (β = .19). This indicates that males are more likely to have high self-esteem. None of the other variables were significant. Adding the prior performance measures at Step 2 did not add significantly to the predicted variance and once again, only gender was significant (β = .19). Dependent on the self-perception structure entered at Step 3, between 15.5% and 50.2% additional variance was added to the prediction of self-esteem over and above that which might be expected by the control determinants and prior academic performance alone (Table 3.8). All the F change probabilities were highly significant.

The first clear effect here was that the SPPA structure (49.7% additional variance) explained substantially more variance than the MSPSE structure (19.3% additional variance). Of the various different factor structures used to measure self-efficacy and self-concept, either separately or in combination, none explained substantially more variance than the SPPA measure. Although the optimal model was the MSPSE/SPPA combined, this was a minimal improvement on the SPPA alone (50.2% vs. 49.7% additional variance explained, and -1.675 vs. -1.655 RMSE change). It appears, therefore, that self-concept is a much stronger predictor of self-esteem than is self-efficacy, and that it makes little difference how precisely this is measured.

According to the SPPA model then, four of the SPPA components make significant independent contributions to self-esteem: perceived Scholastic Competence (β = .15), Social Acceptance (β = .15), Physical Appearance (β = .49), and Behavioural Conduct (β = .21). In all instances, perceived self-concept is positively related to perceived self-esteem. None of the controls or past performance variables were significant in this model. For the MPSPE model, the two significant predictors were perceived Self-Efficacy to Meet Others' Expectations (β = .25) and Self-Assertive Efficacy (β = .15). Gender was also significant, with males more likely to exhibit self-efficacy in these areas (β = .18). The combined MSPSE/SPPA model had essentially the same significant predictors as the SPPA model and the MSPSE model taken together, although it excluded Self-Assertive Efficacy and gender as significant predictors.

Educational aspirations

Table B.7.2 (Appendix B.7) shows the hierarchical linear regression results for educational aspirations[30]. The five Step 1 control variables explained 3% of the variance in educational aspirations. Only high ACORN score was significant (positively; $\beta = .09$), which suggests that high socio-economic status contributes to higher educational aspirations. Gender, free schools meals and SEN were not significant. At Step 2, the model explained 20.5%, thereby adding a further 17.5% of variance. The only significant predictor was KS3 Science ($\beta = .24$). This suggests that good science performance contributes to the prediction of educational aspirations but mathematics and English performance do not.

Taking all the self-efficacy and self-concept models into account (i.e. excluding the Self-Esteem structure), between 3.8% and 7.4% additional variance was added to the prediction of educational aspirations over and above what might be expected by the control determinants and prior academic performance alone (Table 3.8). The Self-Esteem model only added a very limited amount of additional variance at Step 3 (0.1%), demonstrated virtually no reduction in error (RMSE change = -0.001), and the Self-Esteem beta coefficient was not significant. These findings indicate that self-esteem does not make a significant contribution to the prediction of educational aspirations. In contrast, the other self-perception models all appear to play a significant role.

The MSPSE/SPPA was the optimal model (7.4% additional variance, -0.049 RMSE change), although this was only a slight improvement on the First-Order Competency (6.7% additional variance, -0.044 RMSE change) and the MSPSE models (6.6% additional variance, -0.043 RMSE change). These models were a large improvement on the SPPA which evidenced only 4.0% additional variance (-0.026 RMSE change). The findings therefore indicate that self-efficacy is a better predictor of educational aspirations than is self-concept. The number of predictors making a significant independent contribution to educational aspirations was minimal, however. None of the control or prior performance variables were significant and only Self-Efficacy for Academic Achievement was significant in the MSPSE and the aggregate MSPSE/SPPA models ($\beta = .19$ for both). Only Mathematics/Science Competency was significant in the First-Order Competency model ($\beta = .17$), and only Scholastic Competence and Physical Appearance were significant in the

[30] The analyses were repeated using logistic regression, with educational aspirations as a dichotomous variable (1 = intend to go to university, 0 = otherwise). The results were essentially the same as those reported here.

SPPA model (β's = .17 and .12 respectively). These findings indicated that positive self-perceptions in academic contexts are particularly useful for predicting higher educational aspirations, with Self-Efficacy for Academic Achievement being the stronger predictor.

Occupational aspirations

Table B.7.3 (Appendix B.7) shows the hierarchical linear regression results for occupational aspirations[31]. The five Step 1 control variables explained only 0.2% of the variance in occupational aspirations. None of the variables were significant. This indicates that gender, socio-economic status, and ability do not make a significant contribution to the prediction of occupational aspirations. Adding the prior performance measures (Step 2) added significantly to the predicted variance (an additional 8.3%). KS3 English was significant (β = .19), which indicates that good performance in English contributes to the prediction of higher occupational aspirations. None of the other control or prior performance measures were significant. As can be seen from Table 3.8, the addition of the self-perception structures at Step 3 added between zero and 3.9% additional variance to the prediction of occupational aspirations.

The MSPSE and the combined MSPSE/SPPA were clearly the optimal models; both explained 3.9% additional variance to the prediction of occupational aspirations over and above that which might be expected by the controls and prior academic performance (both -0.035 RMSE change). The next best model was First-Order Competency which explained 3.1% additional variance (-0.028 RMSE change). The F change probability for this model was not significant, however. Self-esteem clearly does not contribute to the prediction of occupational aspirations; it did not add any additional variance whatsoever and demonstrated no reduction in error. Taken as a whole, these results suggest that self-efficacy is more predictive of occupational aspirations than is self-concept or self-esteem.

According to the MSPSE and the MSPSE/SPPA models, therefore, one prior performance variable and one self-efficacy factor makes a significant independent contribution to the prediction of occupational aspirations; the indication is that good KS3 English performance and high occupational aspirations are positively related, and once KS3 English is controlled for, perceived Self-Efficacy in Enlisting Social Resources is

[31] The analyses were repeated using logistic regression, with occupational aspirations as a dichotomous variable (1 = very high occupational aspirations, i.e. 8 or 9 on the nine-class scale, 0 = otherwise). The results were essentially the same as those reported here.

positively related to high occupational aspirations (both β's = .19). Prior English performance was also important in the First-Order Competency model (β = .20), although the significant self-perception predictor in this model was Mathematics/Science Competency (β = .22).

Independent Mastery Motivation

Table B.7.4 (Appendix B.7) shows the regression results for Independent Mastery Motivation. The five Step 1 control variables explained 2.2% of the variance in Independent Mastery. The only significant predictor in the model was gender (β = .16), which shows that being male is more likely to contribute to increased levels of Independent Mastery Motivation. Adding the prior academic performance variables at Step 2 added a further 7.8% variance. Gender was once again the only significant variable which indicates that past performance does not contribute to Independent Mastery Motivation. Dependent on the structure entered at Step 3, self-perceptions added between 1.6% and 17.2% additional variance to the prediction of Independent Mastery Motivation over and above that contributed by the control determinants and prior academic performance (Table 3.8).

The first clear effect was that the Self-Esteem model explained the least variance (1.6% additional variance, and -0.005 RMSE change). Despite this, the Self-Esteem coefficient was significant (β = .13), which indicates that self-esteem and this type of motivation are to some extent positively related. The other self-perception models explained more than or approaching 10% additional variance at Step 3, however. This suggests that self-efficacy and self-concept both play a more important role in the prediction of Independent Mastery Motivation than does self-esteem. The optimal model was First-Order Competency, although this was a minimal improvement over the aggregate MSPSE/SPPA and the aggregate First-Order Self-Efficacy/Self-Concept models (17.2% vs. 16.8% additional variance, -0.064 vs. -0.062 RMSE change). It was clear that self-efficacy was a much better predictor than self-concept, with the single-construct self-efficacy models explaining more variance than the single-construct self-concept models (for example, the MSPSE compared to the SPPA: 14.7% vs. 9.8% additional variance, and -0.054 versus -0.036 RMSE change).

According to the First-Order Competency model, two self-perception factors made a significant contribution to the prediction of Independent Mastery Motivation: perceived Self-Efficacy for Self-Regulated Learning (β = .17) and Mathematics/Science Competency (β = .25). Results indicate, therefore, that self-perceptions and this type of motivation are positively related. None of the control or prior performance variables were significant. Self-Efficacy for Academic Achievement (β = .18) and Self-Efficacy for Self-Regulated Learning (β = .19) were significant in the MSPSE/SPPA model, whilst Mathematics/Science Self-Efficacy (β = .20) was significant in the combined First-Order Self-Efficacy/Self-Concept model.

Internal Criteria for Success Motivation

Table B.7.5 (Appendix B.7) shows the regression results for Internal Criteria for Success Motivation. The five Step 1 control variables explained 2.1% of the variance in total. None of the variables were significant, which indicates that gender, socio-economic status, and SEN do not contribute to the development of this type of motivation. Adding the three prior academic performance variables at Step 2 added a further 7.1%. Only KS3 Mathematics was significant (β = .21) and indicates that good mathematics performance is likely to result in increased Internal Criteria for Success Motivation. As can be seen from Table 3.8, dependent on the self-perception structure entered at Step 3, between 0.07% and 5.3% additional variance was added to the prediction of this type of motivation over and above that contributed by the control determinants and prior academic performance alone.

The Self-Esteem model did not add a significant contribution above Step 2 (only adding a further 0.7% variance, -0.003 RMSE change). The beta coefficient was not significant, indicating that self-esteem is not important in the prediction of Internal Criteria for Success Motivation. In contrast, the other self-perception models/structures explained a higher percentage of the variance at Step 3, and all added a significant contribution to the model (between 3.3% and 5.3% additional variance). This indicates that self-efficacy and self-concept, whether measured separately or in combination, both play a significant role in the prediction of Internal Criteria for Success Motivation.

These results indicate that the MSPSE/SPPA and First-Order Self-Efficacy/Self-Concept aggregate structures are the optimal models for the prediction of Internal Criteria for Success Motivation (both 5.3% additional variance, both -0.023 RMSE change). However, excluding Self-Esteem, there was a difference of only around 0.01 unit of change between these models and the one demonstrating the most error overall (Second-Order Self-Concept: 3.3% additional variance, -0.014 RMSE change). According to the MSPSE/SPPA and First-Order Self-Efficacy/Self-Concept models, however, *none* of the control, prior performance or self-perception variables added a significant independent contribution to Internal Criteria for Success Motivation. Only three models demonstrated significant predictors: Second-Order Self-Efficacy (Social Self-Efficacy: β = .15), SPPA (Scholastic Competence: β = .18), and First-Order Self-Concept (Scholastic Self-Concept: β = .18). Results indicate a positive relationship between these types of self-perceptions and Internal Criteria for Success motivation.

Preference for Challenge Motivation

Table B.7.6 (Appendix B.7) shows the regression results for Preference for Challenge Motivation. The five Step 1 control variables explained only 0.5% of the variance in Preference for Challenge. None of the predictors were significant, which indicates that gender, socio-economic status, and SEN do not contribute to the prediction of Preference for Challenge Motivation. Adding the prior academic performance variables at Step 2 added a further 2.8% of variance to the model. None of the predictors were significant, once again, which also suggests that prior academic performance does not contribute to this type of motivation. Dependent on the self-perception structure entered at Step 3, self-perceptions added between 0.5% and 29.2% to the prediction of Preference for Challenge over and above the contribution added by the control determinants and prior academic performance (Table 3.8).

The Self-Esteem model clearly does not make a significant contribution to the prediction of Preference for Challenge Motivation; the model explained only 0.05% additional variance (-0.001 RMSE change) and the beta coefficient was not significant. In contrast, the other self-perception models explained a much higher percentage of additional variance at Step 3: more than 14%. This suggests that self-efficacy and self-concept, whether examined separately or in combination, both make a significant contribution to the prediction of Preference for Challenge. Overall, the aggregate structures explained more variance than the single-construct structures. The MSPSE model explained more variance than the SPPA model (25.7% vs. 15.4% additional variance), indicating that self-efficacy is a stronger predictor of Preference for Challenge Motivation than is self-concept.

The combined MSPSE/SPPA was the optimal model, explaining more variance than the next best (First-Order Self-Efficacy/Self-Concept) (29.2% vs. 26.8% additional variance, and -0.110 vs. -0.100 RMSE change). According to the MSPSE/SPPA model, three factors make significant contributions to Preference for Challenge Motivation: Self-Efficacy for

Academic Achievement (β = .19), Self-Efficacy for Self-Regulated Learning (β = .39), and Job Competence (a SPPA self-concept factor; β = .12). Findings indicate a positive relationship between self-perceptions and this type of motivation. Self-Efficacy for Self-Regulated Learning is particularly important for predicting Preference for Challenge Motivation. None of the control or performance variables were significant.

GCSE Mathematics

Table B.7.7 (Appendix B.7) shows the regression results for GCSE Mathematics. The five Step 1 control variables explained 7.6% of the variance in mathematics ability. Both special educational needs and low ACORN score were significant (β's = -.20 and -.17). This suggests that low socio-economic status and having special educational needs both contribute to the prediction of low GCSE Mathematics, but that gender does not. Adding the prior academic performance variables at Step 2 added a further 58.2% variance to the model. Low ACORN score and KS3 Mathematics were significant (β's = -.12 and .66). This indicates that good KS3 Mathematics performance makes a very substantial contribution to good GCSE Mathematics performance, but once previous academic performances are accounted for, SEN is no longer relevant. Dependent on the structure entered at Step 3, the model added between only 0.3% and 2.6% additional variance to the prediction of mathematics over and above that contributed by the control determinants and prior academic performance.

The Self-Esteem model did not add a significant contribution at Step 3 (only 0.3% additional variance, -0.005 RMSE change) (Table 3.8). The Self-Esteem beta coefficient was also not significant, which suggests that self-esteem does not contribute to the prediction of GCSE Mathematics. In contrast, the self-efficacy and self-concept models explained a slightly higher percentage of variance at Step 3 (additional variance values ranged from 1.1% to 2.6%). The MSPSE/SPPA was the optimal model, although this was a minimal improvement on the MSPSE model (2.6% vs. 2.5% additional variance, and -0.038 vs. -0.035 RMSE change). Note also that the F change value for the MSPSE/SPPA model was not significant. The next best model was First-Order Competency, which was only marginally less predictive (2.1% additional variance, -0.030 RMSE change). The self-concept models were less predictive of GCSE Mathematics than were the other factor structures. Taken as a whole, therefore, self-efficacy appears to be stronger predictor of mathematics than does self-concept or self-esteem.

According to the MSPSE/SPPA model, therefore, one control determinant, one past performance variable, and one self-efficacy component make significant independent contributions to GCSE Mathematics: low ACORN (β = -.11) is predictive of low GCSE Mathematics performance, and good KS3 Mathematics performance is predictive of good GCSE Mathematics performance (β = .67). Once these factors are controlled for, unexpectedly, low Self-Assertive Efficacy predicts high GCSE Mathematics (β = -.12). Low ACORN and KS3 Mathematics were also significant in the MSPSE and First-Order Competency models, although none of the self-perception components were significant in either model.

GCSE English

Table B.7.8 (Appendix B.7) shows the regression results for GCSE English. The five Step 1 control variables explained 6.2% of the variance. Of the controls, only special educational need contributed to the prediction of low GCSE English (β = .16). Adding the prior academic performance variables at Step 2 added a further 62.7% to the model. Gender (β = -.11), KS3 English (β = .48), and KS3 Science (β = .26) were significant. This suggests that males are less likely to be good at English, and that good performance in KS3 English and Science is positively related to better GCSE English performance. Dependent on the structure entered at Step 3, the model explained 0.1% and 1.7% additional variance in the prediction of English over and above the contribution made by the control determinants and prior academic performance (Table 3.8).

It is clear that, consistent with the GCSE Mathematics findings, the Self-Esteem model does not add a significant contribution to the prediction of GCSE English; this explained only 0.1% additional variance, evidenced zero RMSE change, and resulted in a non-significant beta coefficient. The other self-perception structures explained slightly higher amounts of additional variance. However, the amounts were only small and in real terms are unlikely to make an impact. In fact, only two models were significant (Second-Order Self-Efficacy and First-Order Competency), although the results indicate that self-efficacy might be a better predictor of GCSE English than self-concept might be.

The optimal model was First-Order Competency (1.7% additional variance, and -0.020 RMSE change). According to this model, males are more likely to evidence low GCSE English performance (β = -.11), and KS3 English and Science are positively related to GCSE English performance (β's = .46 and .26 respectively). Once these have been controlled for, perceived Self-Efficacy for Self-Regulated Learning predicts GCSE English performance (β = .14). There was very little difference in the RMSE change values across structures, however, with a difference of only around 0.01 unit of change between this model and the one demonstrating the least error (Second-Order Self-Concept); excluding Self-Esteem, that is.

GCSE Science

Table B.7.9 (Appendix B.7) shows the regression results for GCSE Science. The five Step 1 control variables explained 7.6% of the variance in science ability. Having special educational needs is likely to contribute to low GCSE Science performance (β = -.18). Gender and socio-economic status were not significant. Adding prior academic performance at Step 2 added a further 52.7%. KS3 Mathematics and KS3 Science were significant (β's = .16 and .57 respectively) which indicates that good KS3 performance in these areas contributes to good GCSE Science performance, KS3 Science especially so, which is logically what we would expect. Dependent on the structure entered at Step 3, self-perceptions add only between 0.6% and 6.2% to the prediction of science performance over and above the contribution made by the control determinants and prior academic performance alone (Table 3.8).

Once again, it is clear that self-esteem does not add a significant contribution to predicting GCSE Science; it explained only 0.06% additional variance, evidenced only -0.007 RMSE change, and the beta coefficient was not significant. In contrast, the other self-perception structures explained 3.6% additional variance or more and all the models were highly significant. This suggests that both self-efficacy and self-concept, whether measured separately or in combination, significantly contribute to the prediction of GCSE Science.

First-Order Competency is the optimal model, although this was only a minimal improvement on the aggregate MSPSE/SPPA model (6.2% vs. 5.9% additional variance, and -0.084 vs. -0.080 RMSE change). According to the First-Order Competency model, two prior performance variables and three self-perception variables make independent significant contributions to the prediction of GCSE Science performance. High KS3 Mathematics (β = .17) and high KS3 Science (β = .52) are likely to result in high GCSE Science performance. Once these are controlled for, high perceived Self-Efficacy for Self-Regulated Learning (β = .20) and high perceived Good Conduct Competency (β = .14) predict GCSE Science, whilst high perceived Communication/Performing Arts Self-Efficacy ($\beta = -.16$) predicts *low* GCSE Science performance.

Best predicting model overall

Taken as a whole, either the First-Order Competency model or the aggregate MSPSE/SPPA model was the best predictor in terms of overall model fit. The First-Order Competency model is optimal for the prediction of Independent Mastery Motivation, and GCSE English and Science. The MSPSE/SPPA model is optimal for self-esteem, both types of aspiration, Internal Criteria for Success and Preference for Challenge motivations, and GCSE Mathematics. Table 3.10 shows which variables/factors make a significant independent contribution to the prediction of the various outcomes for these two structures. As can be seen, no one self-perception factor was consistently significant across all the outcomes, although academic factors seemed particularly important for predicting the academic outcomes. The most important factor seems to be Self-Efficacy for Self-Regulated Learning which is significant for predicting Independent Mastery and Internal Criteria for Success motivations, and GCSE English and Science. Self-Efficacy for Academic Achievement, or its corresponding factor in the First-Order Competency model (Mathematics/Science Competency), was also important for predicting aspirations and these two types of motivation.

Table 3.9 shows that the optimal self-efficacy and self-concept models are the MSPSE and the SPPA. The MSPSE was clearly the optimal of the two for prediction in terms of overall model fit. As shown in Table 3.8, the MSPSE explained much more variance and demonstrated less error for seven of the eight academic outcomes. None of the factors were consistently significant in either of these models, although, consistent with the First-Order Competency and MSPSE/SPPA structures, academic factors (including Scholastic Self-Concept) were important for predicting the academic outcomes. Overall, there was little evidence that other types of self-concept (non-academic) predict academic functioning. Non-academic self-concepts (Friendship, Social Acceptance, Physical Appearance, and Behavioural) had utility for predicting self-esteem, however; with Physical Appearance being the most important (the beta coefficients were much higher for this factor).

As would be expected, across all models, prior academic performance makes a significant contribution to subsequent academic performance (as well as to occupational aspirations in some of the models). Gender contributes to performance in English, and to self-esteem in the self-efficacy models.

3.4 Discussion

3.4.1 Do self-perceptions predict academic outcomes after controlling for prior academic performance, ability and other factors?

These results demonstrate that determinants such as gender, socio-economic status, and SEN are important in the prediction of academic functioning, as well as in the prediction of self-esteem. Together these determinants explain between 0.5% and 7.6% of the variance, depending on outcome measure. Together they explain the most variance in models that have an indicator of GCSE performance as the outcome; 7.6% for Mathematics, 6.2% for English, 7.6% for Science. Prior academic performance is also important in the prediction of these outcomes. Together the three KS3 variables add between 0.1% and 62.7% additional variance at Step 2. They explain the least additional variance in self-esteem, whilst, as might be expected, they explain the most in GCSE performance (58.2% for Mathematics, 62.7% for English, and 52.7% for Science). The additional variance explained in the aspiration and motivation variables falls between 2.8% and 7.8% for motivation, and is 8.3% and 17.5% respectively for occupational and educational aspirations.

The initial regression analyses show that gender has a weak but consistent relationship with three outcomes: males have significantly higher self-esteem and are more likely to exhibit higher Independent Mastery and Internal Criteria for Success motivations. There was some evidence of mediating relationships. A variable functions as a mediator (or an intervening or process variable) if it accounts for some or all of the relationship between the independent (predictor) and dependent (outcome) variables (Baron & Kenny, 1986). These authors outline a number of criteria that must be met before evidence of mediation can be concluded: (1) the independent variable is significantly correlated with the dependent variable and with the mediator, (2) the mediator is significantly related to the dependent variable after the effects of the independent variable are accounted for, and (3) the effect of the independent variable on the dependent variable is reduced or becomes non-significant (which indicates partial or complete mediation respectively) once the mediator is included in the regression equation.

Here, once prior academic performance was added into the model, the gender–Internal Criteria for Success Motivation link no longer remained. This suggests that past academic performance (in this case, mathematics) mediates (or intervenes in) the relationship between gender and Internal Criteria for Success Motivation. When self-perception was added into the model at Step 3, gender no longer remained significant for predicting either the Independent Mastery or Internal Criteria for Success motivations. These results were generally consistent for all self-perception structures (including self-esteem) and indicate that self-perceptions mediate the relationships between these types of motivation and gender. There was also some evidence that academic self-perceptions might mediate the relationship between past mathematics performance and Internal Criteria for Success Motivation. Findings also suggest that the relationship between gender and self-esteem is to some extent mediated by self-concept.

There were two socio-economic indicators used in this research: free school meals and ACORN scores. The analyses revealed that taking free school meals was not important in the prediction of these outcomes, including self-esteem. On the other hand, ACORN score proved to be important in relation to educational aspirations and GCSE Mathematics; the lower the ACORN score, the lower the aspirations and performance. After prior academic performance was added into the model ACORN score was no longer significant for educational aspirations, which indicates that the relationship between socio-economic status and educational aspirations is mediated by past academic performance (in this case, science performance). Science performance dropped out when self-perceptions were added into the model, which indicates that self-perceptions mediate the relationship between past science performance and educational aspirations. This effect was only apparent for the self-efficacy and self-concept models, however, not for self-esteem.

The initial regressions demonstrated a relationship between SEN and the three academic performance outcomes. As would be expected, students with special educational needs are more likely to exhibit significantly reduced performance in GCSE Mathematics, English and Science. Once past academic performance and, following that, self-perception factors were added into the model, the effect of special educational needs on all three GCSE variables was no longer significant, however. This suggests that past academic performance is likely to mediate the relationship between SEN and subsequent academic performance, i.e. past academic performance impacts on how well one does academically, but in itself is influenced by whether or not a student has special educational needs. Past mathematics performance is a significant predictor of later mathematics performance; English and science performance predict later English performance; and mathematics and science performance predict later science performance. The findings also suggest that the relationship between SEN and GCSE performance is also mediated by self-perceptions.

The findings do not indicate that past academic performance has an influence on self-perceptions, however. The effect of prior GCSE performance remained when self-perceptions were added into the model at Step 3 which means that, in these analyses, past performance does not influence self-perceptions to any great extent. The relationship between self-perception and performance demonstrated here, is not, therefore, a consequence of self-perception being based on prior performance. This effect is consistent for all types of self-perception. These results do not support previous research that suggests that academic performance influences the development of self-perceptions (e.g. Guay et al. 2003), and are the opposite of what was expected. According to self-efficacy theory (Bandura, 1997), self-perception and academic performance have a reciprocal relationship, so we would expect past performance to influence self-perceptions.

Hence, taken together, these findings indicate that self-related perceptions are useful for predicting self-esteem and the academic outcomes examined here, over and above the prediction that might be expected based on gender, socio-economic status, SEN, ability and previous academic performance alone. The predictive function of self-perceptions is very much dependent on the type of self-perception construct, the specific self-perception factor, and the specific outcome being measured, however. This is discussed in the following sections.

3.4.2 Which aspect of the self is the most important for predicting academic outcomes?

Which of self-esteem, self-concept and self-efficacy is the better predictor of the academic outcomes?

Taking all eight academic outcomes into account, both self-efficacy and self-concept are shown to be useful constructs for prediction. Of these, self-efficacy is the better predictor overall. Self-esteem, on the other hand, has not been demonstrated as a useful predictor of the academic outcomes studied here.

Self-esteem does not predict the eight academic outcomes at all well, explaining in the main less than 1% additional variance after accounting for the control determinants and prior academic performance. Self-esteem explains a higher amount of variance in Independent Mastery Motivation, but this is still low at 1.6%. It explains the least additional variance in aspirations (zero and 0.1%), and only explains between 0.1% and 0.6% additional variance in GCSE performance. This amount of variance is very low and in real terms is unlikely to be relevant. If, for example, the aim is to intervene to improve self-esteem with the intention of positively influencing academic performance, motivation, aspirations, etc., then these amounts of variance are unlikely to have any significant impact. These findings are consistent with previous research that suggests there are only very weak relationships between self-esteem and academic performance, and self-esteem and aspirations, after accounting for underlying factors such as ability, past performance and socio-economic status (e.g. Ross & Broh, 2000; Rubin et al., 1976, 1977; Schmidt & Padilla, 2003; Young, 1997).

Comparing the MSPSE and the SPPA – the two optimal single-construct self-efficacy and self-concept structures – there is a marked difference in the amount of additional variance explained across seven of the eight academic outcomes. Self-efficacy explains more additional variance than self-concept in all of the outcomes except Internal Criteria for Success Motivation, where the two constructs are comparable (4.2% vs. 4.6% additional variance). For the other two motivation variables, self-efficacy explains around 5% to 10% more additional variance than does self-concept (Independent Mastery: 14.7% vs. 9.8%; Preference for Challenge: 25.7% vs. 15.4%). In relation to aspirations, the differences in additional variance explained between self-efficacy and self-concept are smaller, however: around 2.5% (educational: 6.6% vs. 4%: occupational: 3.9% vs. 1.4%). The differences between self-efficacy and self-concept for predicting GCSE performance are even smaller: between 0.4% and 1.5% (Mathematics: 2.5% vs. 1.0%; English: 1.3% vs. 0.9%; Science: 5.0% vs. 3.9%).

Taking account of the fit of the models, self-efficacy is the optimal of the three self-perceptions for prediction. It is more predictive of Independent Mastery and Preference for Challenge motivations than any of the other outcomes, explaining between 11.7% and 25.7% of additional variance in motivation across the three single-construct self-efficacy structures, and more for the aggregate structures. In contrast, self-efficacy explains only between 3.2% and 4.2% of additional variance in Internal Criteria for Success Motivation. Given the strong nature of the relationship between the two former types of motivation and self-efficacy, we might expect that interventions aimed at enhancing self-efficacy would be highly likely to also facilitate improvements in motivation. However, we must be careful about making causal inferences here; the findings only indicate a relationship between self-efficacy and motivation, they do not show the direction of the relationship. Whilst evidence suggests that self-perceptions have a causal influence over intrinsic motivation (e.g. Bouffard, 2000; Gottfried, 1990; Spinath & Spinath, 2005), this could not be assessed here because no prior motivation measure was included in the analyses. This meant that the effects of prior motivation could not be controlled for; it was not possible to determine whether self-efficacy adds additional variance to students' motivation, over and above how motivated they are already. The strong predictive relationship between self-efficacy and motivation may simply be, therefore, because the variables are strongly correlated. Had a prior motivation measure been included, the predictive relationship between self-efficacy and motivation might have been weaker.

Self-efficacy explains a much reduced amount of additional variance in the non-motivation academic outcomes (single-construct structures – educational aspirations: 4.7% to 6.6%; occupational aspirations: 1.9% to 3.9%; GCSE Mathematics: 1.5% to 2.5%; GCSE English: 1% to 1.3%; and GCSE Science: 3.9% to 5%). This small amount of additional variance explained is in some cases highly significant. However, it remains to be seen whether this amount of variance is enough to effect significant improvements to students' aspirations and performance, via interventions designed to improve self-efficacy perceptions. We might expect that any changes in self-efficacy would be more likely to impact on science performance or educational aspirations, given that these evidence the most additional variance. We must be careful about drawing conclusions about self-efficacy having a causal influence over aspirations, however. As with the motivation outcomes, no prior aspiration measures were included in the analyses. It was not, therefore, possible to determine whether self-efficacy adds additional variance to students' aspirations, over and above how aspirational they already are. Had a prior measure of educational aspirations been included, for example, the predictive relationships might have been much weaker. We can be more definite about drawing conclusions about the causal influence of self-perceptions in relation to GCSE performance; as indicators of prior performance were included in the analyses, it was possible to conclude that self-perceptions add variance to the prediction of future performance over and above how competent students already are.

If we take into account all of the factors that make an independent contribution to the four optimal models shown in Tables 3.9 and 3.10 (MSPSE and SPPA, First-Order Competency, and MSPSE/SPPA), the overall pattern of significant findings indicates that self-efficacy factors are more predictive of academic functioning than are self-concept factors. Two factors are particularly important: Self-Efficacy for Self-Regulated Learning and Self-Efficacy for Academic Achievement (or its corresponding factor in the Competency structure: Mathematics/Science Competency). The first of these seems to be the most consistent predictor and is significant for two types of motivation: Independent Mastery and Preference for Challenge. Self-Efficacy for Academic Achievement is also significantly predictive of these two types of motivation. It is unclear why these two representations of self-efficacy should predict these types of motivation better than they do Internal Criteria for Success Motivation. It is possible that Internal Criteria for Success is a more affective type of motivation and, as such, does not relate well to academic cognitive representations of the self. This does not explain why Scholastic Competence (self-concept) significantly predicted this type of motivation, however. It could be because, as explained in Chapter 2, some items of the SPPA appear to ask for evaluative feeling judgements, despite Harter's (1988) claim that the measure calls for only cognitive judgements of competence.

Self-Efficacy for Academic Achievement (or its corresponding measure) also significantly predicted aspirations: educational aspirations more so. This might be expected as these types of aspirations are likely to be seen to be more achievable in the short-term. What was surprising was that Self-Efficacy for Academic Achievement was not predictive of any of the performance measures. This might be because, for students of this age, an all-round perceived ability to be able to regulate learning activities (Self-Efficacy for Self-Regulated Learning, for example) might be seen as more important at this stage of their education than ability to perform in different subjects. It might be that as a student progresses in their educational career, academic competencies for different subjects will become more important.

Self-Efficacy for Self-Regulated Learning was predictive of English and Science GCSE but not of Mathematics GCSE. The percentages of variance explained in the models overall were much higher for science, however. It is unclear why this type of self-perception should have more of an impact on science performance. Perhaps it is because science is viewed by students as something that education can have more of an impact on.

This is to say that mathematics performance might be seen as much more of an ability which cannot be changed – you are good at mathematics or not. Therefore, it would have no relationship with competencies that represent how well one can regulate learning. Moreover, English might be more associated with what goes on in the home: cultural capital, for example. Or it might be more to do with how much one reads, or how literate one is. Therefore, within students' minds, the ability to regulate learning in a school environment might not be viewed as something that can impact on English performance.

Taken together, these findings indicate that self-efficacy is a better predictor of the academic outcomes under consideration here than is self-concept, and in the main, this effect remains constant across the trials. Of the individual factors, Self-Efficacy for Self-Regulated Learning appears to be the most consistent and important predictor. If we put aside the fact that the lack of motivation control measures might have inflated self-perception–motivation relationships, the findings suggest that there is more scope for intervening to positively influence this type of self-efficacy with the ultimate aim of improving Independent Mastery and Preference for Challenge motivations, but that there is only very limited scope for doing so to improve English performance. Over 25% additional variance might result in a significant real-term improvement in motivation, but less than 2% variance explained in English is much less likely to do so. In this case it might be better to teach more English rather than trying to enhance English via improving self-perceptions. This is not to say that intervening to improve self-perceptions is not of benefit at all. It may be worthwhile doing if any improvements have a subsequent positive influence on motivation or other aspects of functioning. It just might not make any difference to how well students do in academic subjects.

These findings are consistent with previous research that suggests that self-efficacy is a better predictor of academic performance than self-concept (e.g. Mone et al. 1995; Pajares & Johnson; 1994), even after controlling for prior ability (e.g. D'Amico & Cardaci, 2003; Pietsch et al., 2003). They are also consistent with research that shows that once prior ability/performance has been accounted for, the self-efficacy–performance relationship is much weakened. Early research, which failed to include ability, prior performance and other control variables, suggests that self-efficacy explains around 14% of the variance in academic performance (e.g. Multon et al., 1991). In contrast, the findings here, which do control for these factors, show much lower amounts of explained variance.

These findings are also consistent with previous research that shows domain-specific self-concept to be a predictor of performance even after controlling for prior ability, etc. (e.g. Marsh et al., 1999; Marsh & Craven, 2006; Marsh & Yeung, 1997a). However, such research suggests that various aspects of self-concept provide robust predictions of performance. The findings presented here indicate that this is not the case: only Scholastic Competence (self-concept) was a consistent predictor of the outcomes. It has been suggested that academic self-concept is a construct approximating self-efficacy (Bong & Clark, 1999). Hence, this might be why it predicted to a similar extent as some of the academic self-efficacy variables. The majority of previous research in this area has used self-concept measures based on the Marsh/Shavelson structure. Where research has used other measures (e.g. Ma & Kishor, 1997), weaker relationships have been found. This research supports these findings.

Previous research is consistent with the idea that self-efficacy has predictive utility for both educational and career aspirations (e.g. Nevid & Rathus, 2007; Bandura et al., 1996, 2001). Such research is limited for failing to control for ability, past performance, and other student variables, however. Having included these variables, this research confirms that this predictive relationship still holds for both types of aspirations (with the caveat that a lack of aspiration control measures might have inflated self-perception–aspiration relationships, however). In relation to self-concept, it has been suggested that when controlling for these factors, the effects of self-concept on aspirations disappear (Looker & Pineo, 1983). However, these findings do suggest that some aspects of self-concept (Scholastic and Physical Appearance) are predictive of educational, but not occupational aspirations. On the whole, therefore, self-concept is less predictive of aspirations than is self-efficacy.

Which of self-concept and self-efficacy is the best predictor of self-esteem?

Whilst self-efficacy seems to be a better predictor than self-concept for the academic outcomes in question, the opposite is true for the prediction of self-esteem. Both self-efficacy and self-concept are highly significantly predictive of self-esteem, but self-concept much more so; self-efficacy explained between 15.5% and 19.3% additional variance across the three single-construct self-efficacy structures, whereas self-concept explained between 38.7% and 49.7% additional variance across the three single-construct self-concept structures. Comparing the SPPA and MSPSE structures, self-concept explained 30.4% more additional variance than self-efficacy (49.7% vs. 19.3%). Looking at all of the factors that make an independent contribution to the four optimal models shown in Tables 3.9 and 3.10, three types of self-concept are particularly important: Social Acceptance, Physical Appearance and Behavioural Conduct. Friendship Self-Concept is also important but to a lesser extent. The results indicate that more positive self-concept in these areas predicts more positive self-esteem. There is less evidence that self-efficacy factors are important: those that have shown up as significant are related to social and behavioural aspects of the self, which could be viewed as being less cognitive than some of the self-efficacy variables. Overall, therefore, it can be concluded that self-concept is the stronger predictor of self-esteem.

The strong link between self-concept and self-esteem is theoretically expected. Self-esteem and self-concept are closely related conceptually and both contain affective components. It has been argued that because self-concept contains affective elements, it is likely to evidence stronger relationships with self-esteem, which is a totally affective construct, than self-efficacy, which is primarily cognitive (Bong & Clark, 1999). These findings support this assertion. The self-esteem measure is also a subscale of the original SPPA, so we might expect that self-concept measures based on the SPPA would be more likely to boost the variance explained on the self-esteem outcome than would the self-efficacy measures. Correlations between self-concept and self-esteem factors were also higher than they were between self-efficacy and self-esteem factors (see Appendix B.6), as one might expect given the regression findings. The correlations between self-efficacy/self-concept and self-esteem were also higher in general than they were between self-efficacy/self-concept and the other outcomes.

A question to be answered in this thesis is, given that self-concept is more likely to be a better predictor of self-esteem, what implications would this have for aggregate self-competence measures comprised of both self-efficacy and self-concept elements? These findings show that the Competency structures are good predictors of self-esteem, evidencing only slightly less additional variance than the distinct self-concept structures. This level of predictiveness could be related to the high component of self-concept items within the measures. Had more self-efficacy items been included, the Competency structures might not have been so predictive of self-esteem. However, the predictive utility of individual competency factors did not seem to be related to the number of self-concept/self-efficacy items within the factors, but was more associated with the factor content; academic factors were less likely to predict self-esteem.

Do academic self-perception factors predict academic outcomes better than do non-academic factors?

Academic factors were important for predicting the majority of the outcomes, including self-esteem. The significant academic factors were Mathematics/Science Competency, Self-Efficacy for Self-Regulated Learning, Scholastic Competence (an original SPPA self-concept factor), Communication/Performing Arts Self-Efficacy, and Self-Efficacy for Academic Achievement. Some of these factors were relevant for more than one structure. The significant *non*-academic factors were Friendship Self-Concept, Physical Appearance, Good Conduct Competency, Social Acceptance, Behavioural Conduct, Self-Efficacy to Meet Others' Expectations, Self-Assertive Efficacy, Self-Efficacy for Leisure-Time Skills and Extracurricular Activities, Self-Efficacy in Enlisting Social Resources, Self-Regulatory Efficacy, and Job Competence.

Social factors were very relevant in the prediction of self-esteem (a non-academic factor). Scholastic Competence (self-concept) also showed up as important but this was only one academic factor in amongst many social factors. A number of social factors were significant in the prediction of both types of aspiration, Independent Mastery and Preference for Challenge motivations, and GCSE Science. These were very sporadic across the outcomes, however, and none of the factors showed up as consistently significant across all the structures. On the other hand, academic factors seemed very relevant in the prediction of academic outcomes; a number of academic factors were significant for more than one academic outcome and more than one structure. As already discussed, Self-Efficacy for Self-Regulated Learning was particularly important.

Taken together, these results suggest that academic self-perception factors predict academic outcomes better than do non-academic factors and vice-versa. These findings support research that demonstrates stronger within-domain than cross-domain relationships, and suggests that self-perceptions in academic contexts are more predictive of academic functioning than of *non*-academic functioning (e.g. Bong & Clark, 1999; Bong & Skaalvik, 2003; Skaalvik, 1997a).

3.4.3 To what extent are the self-perception structures derived from the Chapter 2 analyses valid as predictors of academic outcomes?

Which structure is the better predictor?

The optimal structures overall would appear to be the First-Order Competency and the MSPSE/SPPA structures. Taking into account the percentage of additional variance explained by the models at Step 3, the First-Order Competency structure was the best predictor of Independent Mastery Motivation, GCSE English, and GCSE Science (the percentages of additional variance explained were 17.2%, 1.7% and 6.2% respectively). The aggregate MSPSE/SPPA structure was the best predictor of self-esteem, educational and occupational aspirations, Internal Criteria for Success and Preference for Challenge motivations, and GCSE Mathematics (50.2%, 7.4%, 3.9%, 5.3%, 29.2% and 2.6% additional variance explained respectively). The differences between the two models in terms of additional variance explained and RMSE reduction were very small, however, and for five of the nine outcomes, the other of these two measures was the second best predictor.

There was a wide range in the amount of additional variance explained at Step 3 of the regressions. The F change probabilities for all the Competency and MSPSE/SPPA models *except* the MSPSE/SPPA–GCSE Mathematics model were significant or highly significant. In addition, each of these models demonstrated the least error when compared to the other structures. These results thereby confirm the validity of these models for prediction. Whilst the F change value for the MSPSE/SPPA–GCSE Mathematics model was not significant, this structure demonstrated the least error of all the other self-perception–GCSE Mathematics models. It has been argued that RMSE is the most important criterion for determining whether a model is valid for prediction (Pindyck & Rubinfeld, 1998). Therefore, it can safely be assumed that the MSPSE/SPPA structure is valid for predicting GCSE Mathematics.

The distinct First-Order Self-Efficacy and First-Order Self-Concept structures did not predict to a greater extent than the original MSPSE and SPPA structures, contrary to what was expected. The MSPSE was the optimal distinct structure for predicting self-efficacy, whilst the SPPA was the optimal distinct structure for predicting self-concept. The amounts of additional variance explained by these measures, relative to the individual outcomes, have been discussed above. Taking the second-order structures into account

(Structures 3, 6, 9 and 12), the best predictor of these overall was Second-Order Competency. In most instances the amount of additional variance explained relative to each outcome was not too far from that explained by the First-Order Competency measure. The exception was the self-esteem outcome where First-Order Competency explained 10% more additional variance (47.7% vs. 37.6%). Whilst a few of the F change values for specific outcomes were not significant, because the error within the models was low, it can be safely assumed that the models are valid for prediction.

Do measures that aggregate self-efficacy and self-concept items predict more strongly than distinct self-efficacy or self-concept measures?

The results show that the aggregate-construct structures (that contain both self-efficacy and self-concept components) tend to predict better than do the distinct self-efficacy or self-concept structures. The two optimal aggregate structures (First-Order Competency and MSPSE/SPPA) averaged 12.8% and 13.6% additional variance explained across all nine outcomes. In contrast, the optimal distinct structures (MSPSE and SPPA) averaged only 9.2% and 10% additional variance across the outcomes. Furthermore, the second-order aggregate structures predicted better than the second-order distinct structures. The finding of an increased amount of explained variance when including both self-efficacy and self-concept in the regression equation, compared to including only one of the constructs, supports research presented by Skaalvik and Skaalvik (2004a).

Within these models, the domain-specific Mathematics/Science Competency factor was as predictive of the outcomes as Self-Efficacy for Academic Achievement, and Good Conduct Competency seemed to be more predictive that its corresponding factor in the MSPSE (Self-Regulatory Efficacy). The behavioural and academic factors in the Second-Order Competency structure were also as predictive as their corresponding factors in the MSPSE. As such, this indicates that self-competence measures are as useful for predicting academic functioning as are self-efficacy and self-concept measures.

The additional variance explained in self-esteem was also much higher using aggregate structures than it was using self-efficacy structures; from 37.6% to 50.2% across the five aggregate structures. These values were consistent with the set of self-concept structures, however. Much of the variance explained by the aggregate structures in predicting self-esteem was related to the self-concept factors; very few self-efficacy factors made an independent contribution to the aggregate models when predicting self-esteem.

Overall, the five aggregate structures explained the most additional variance in Independent Mastery and Preference for Challenge motivations (between 15.2% and 29.2%), although as discussed previously these strong relationships might partly be a consequence of having no motivation control measures in the analyses. The additional variance explained for the other academic outcomes was much lower; between 1% and 7.4%. This pattern of findings is consistent with that demonstrated by the single-construct structures (for both self-efficacy and self-concept). It would seem that self-efficacy and self-concept are both more relevant for predicting self-esteem, and specific kinds of motivation, than they are for predicting aspirations and academic performance.

Do higher-level general self-perception measures predict global indices of academic performance more strongly than do domain-specific measures?

Overall, the first-order structures tended to predict better (explaining more additional variance) than the second-order structures. This was consistent for the distinct self-efficacy and self-concept structures and for the aggregate structures (for example, the MSPSE and the First-Order Self-Efficacy structures both predicted better than the Second-Order Self-Efficacy structure).

In relation to GCSE performance, the finding that the first-order structures predicted better than second-order structures was expected. Bandura (1997) argues that the most predictive utility is obtained when the specificity of the self-perception and academic performance measures correspond (see also Multon et al., 1991; Pajares & Miller, 1995). As the closest correspondence with the performance measures used here was that provided by the domain-specific first-order structures, following Bandura it was expected that these structures would be the better predictors of academic performance.

3.4.4 In conclusion

The findings of this chapter demonstrate that some aspects of self-efficacy and self-concept are useful for the prediction of academic outcomes, as well as being useful for predicting self-esteem. Furthermore, prediction is retained over and above what might be expected based on prior academic performance and other determinants such as gender, socio-economic status and ability. However, there was no support for using self-esteem to predict such outcomes. Of the three self-perceptions, self-efficacy played the most central role in prediction. Self-concept was more important for predicting self-esteem. These findings suggest that it may be considerably more effective to increase academic performance through changes in self-efficacy and self-concept, rather than self-esteem. This recommendation can be contrasted with suggestions that interventions should be aimed at self-esteem in order to positively influence subsequent performance. The findings of this investigation therefore suggest that future comparisons of self-perception, in relation to academic performance specifically, need not include self-esteem, but may instead focus on the relative differences between self-efficacy and self-concept.

The finding that the aggregate MSPSE/SPPA structure predicted better than the majority of the other structures was surprising and may be partly related to the large number of items in this structure overall. The finding that the First-Order Competency structure predicts well was, in part, expected. This is because the factors within this structure proved to demonstrate higher or similar reliabilities to comparable factors derived from the single-construct factor structures and from the MSPSE and SPPA original measures. It was less expected that the MSPSE and SPPA structures would be better predictors than the revised self-efficacy and self-concept structures that were based on factor analyses of these measures, however. The revised factor structures generally produced higher or similar reliabilities to comparable factors from the original measures and the factors seemed to be more theoretically meaningful and interpretable. Whilst factor analysis of the MSPSE and SPPA has made the measures more reliable and efficient for delivery (by reducing the number of items), it seems that these measures are less efficient in terms of capability to predict outcomes. Although, note that the differences in variance explained between the original and revised structures was in most cases minimal.

These results indicate that it is not only theoretically sound but empirically warranted to use the four optimal structures shown in Tables 3.9 and 3.10 as appropriate assessment measures when the types of academic outcomes researched here are the criterion. However, given that the amounts of additional variance explained overall is relatively similar when compared across structures (discounting the Self-Esteem structure, which proved *not* to be an appropriate predictor), where the fit of the model proved to be significant, those structures can also be used as theoretically sound measures for research investigating the types of outcomes considered here.

The results presented here indicate that it might be advantageous to intervene to improve various self-perception constructs, especially self-concept and self-efficacy. While improving these self-perceptions might be a worthwhile educational goal in itself, these results imply that positively influencing self-perceptions via intervention might also positively impact on certain academic outcomes. These results show evidence of self-perception–academic outcome relationships. The measures used are the most predictive of perceived self-esteem, and Independent Mastery and Preference for Challenge motivations. They are the least predictive of occupational aspirations, and GCSE Mathematics and GCSE English, but slightly more predictive of GCSE Science, educational aspirations and Internal Criteria for Success Motivation. This suggests that interventions aimed at enhancing self-concept and self-efficacy might not be viable for fostering improved aspirations, GCSE performance, and certain types of motivation, but they might be viable for fostering improvements in self-esteem and other types of motivation (but again with the caveat that a lack of motivation control measures might have overstated self-perception–motivation relationships). Self-esteem might ultimately then have effects on other aspects of behaviour. Self-concept and self-efficacy interventions may be less beneficial in terms of directly improving GCSE performance and aspirations, but these might ultimately be influenced via effects on motivation. Facilitating improvements in motivation might therefore be a worthwhile educational goal in itself.

These findings indicate that it might be better to focus on specific aspects of self-perception, however. Education would be better served by directing efforts towards enhancing self-efficacy to regulate one's learning activities in order to effect change in motivation and GCSE performance. The focus would be better placed on enhancing self-efficacy/competency for academic achievement in more focused subject areas, especially mathematics and science, in order to positively influence educational aspirations, as well as motivation. To effect change in self-esteem, we should be focusing on facilitating more positive social, physical appearance and behavioural self-concepts.

4 THE EFFECTS OF AN INTERVENTION DESIGNED TO ENHANCE SELF-RELATED PERCEPTIONS

4.1 Introduction

Strategies for improving students' self-related perceptions/beliefs are an important part of individual teachers' day-to-day classroom practice. Students are praised when they perform well, not just to reinforce good performance but also so that they feel good about themselves (Brophy, 1981). Personal development planning, which encourages students to explore their own strengths and weaknesses, is increasingly a part of secondary school curricula (UK National Curriculum website[32]). Arguably, however, students require not only external reinforcement, but also strategies that allow them to maintain positive self-belief when external reinforcement is absent. Praise from others is necessarily unreliable, and access to this outside of school time will vary considerably across students. By contrast, internal reinforcement is potentially always available. However, this requires that students have self-regulated strategies for developing and maintaining positive self-belief. In some contexts and for some students these strategies will develop without explicit intervention. In other cases, they may need to be trained. In response, partly to a desire to improve academic performance, and partly to a conviction that developing students' self-perception falls within a secondary education remit, UK schools are increasingly adopting training programmes aimed specifically at developing self-perception and motivation.

This research uses one such programme, which was implemented by a number of schools involved in the research, as a way of examining whether self-perceptions can be enhanced and whether any changes are likely to persist in the long-term. The programme was created by The Pacific Institute (TPI), a commercial organisation that offers a range of occupational and educational programmes for students and educators that are designed to enable people "…to examine their individual and collective habits, attitudes, beliefs and expectations", and thus "translate their potential into performance" (The UK Pacific Institute website[33]). The Pacific Institute educational programmes are used widely across schools in the UK and their use is supported by the UK Government. The specific programme used here is called *Go For It!* (GFI; TPI, 2000). *Go For It!* is intended for

[32] Available at: http://curriculum.qcda.gov.uk/index.aspx
[33] Available at: http://www.pacificinstitute.co.uk/pages/aboutUs.asp

students at Key Stage 4 (the highest compulsory-education curriculum level, associated with Years 10 and 11, aged 14 – 16 years of age) and is typically administered to whole Year 10 cohorts. The programme aims to teach students general cognitive strategies for developing positive self-perceptions and accountability. The intervention content is not domain-specific and the strategies taught are, in principle, aimed at being applied across a wide range of situations, including those relating to behaviour management, and parental and social relationships. However, the context in which GFI is delivered in schools, and the focus of many of the exercises and examples, centres on improving self-perceptions in relation to academic functioning and attainment. Students are encouraged to develop positive self-belief and set goals in relation to their school work. In the UK, and for this age-group, this means a focus on good performance in GCSE assessments taken at the end of compulsory education. *Go For It!* is typically implemented across year groups rather than being targeted at particular sub-populations.

The GFI programme is used extensively in UK secondary schools and schools in other countries, including the US (as evidenced on TPI's Global website[34]). Within the UK city targeted in this research, GFI was first introduced in September 1999. By 2003, 11 secondary schools had either started to implement GFI or planned to do at the start of the 2003/2004 academic year. Anecdotal accounts, and an early review of the pilot programme (commissioned by the Local Education Authority in this area), suggested that students enjoy and perceive benefit from the GFI programme and teachers reported substantial effects on students' attitudes towards their work (Johnson, 2000). *Go For It!* appeared to result in an immediate increase in students' tendency to see schoolwork as important. However, despite its widespread use, the effects of the programme on psychological and academic functioning have not been systematically evaluated.

The content of the GFI programme is summarised in Table 4.1. It comprises 12 sessions/units delivered by trained instructors, who are often also teachers within the participants' school. Delivery is by a combination of from-the-front presentations, and individual and group exercises. These are designed to develop students' belief in their ability to perform well, and to give them cognitive strategies for maintaining positive self-perceptions. Students' learning is not assessed. Units can be delivered as a single, three day course, with students taking time out from the normal curriculum and, in some cases, going

[34] Available at: http://www.thepacificinstitute.us/v2/

to an off-campus venue. They can also be combined with the normal curriculum and delivered over several weeks, typically within PHSE classes.

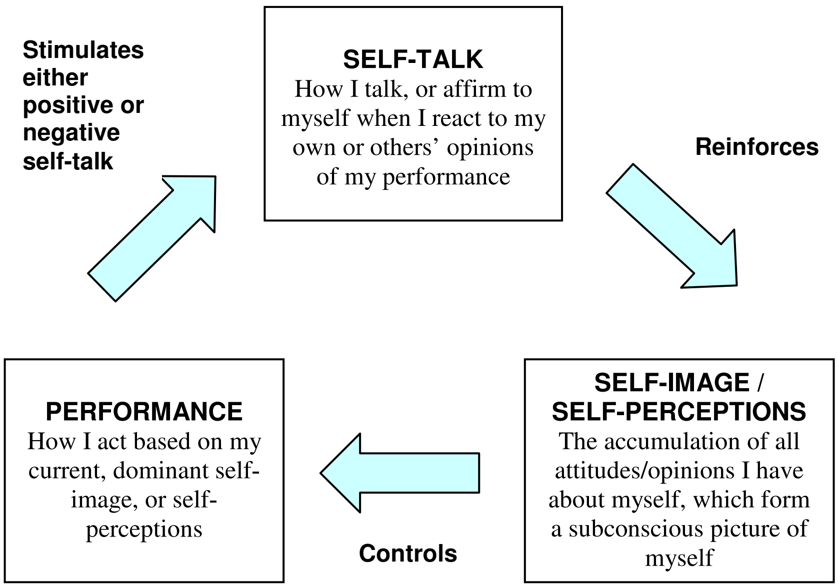
Table 4.1 ***Go For It!*** **units and unit content**

Unit	Unit title	Unit content
1	You are smart & capable	Exercises/examples designed to demonstrate that 'How you think affects the way you act'. This unit covers the effects of mental 'set' and expectations on perceptions. It compares the thinking patterns and distinctive characteristics of successful and less successful people.
2	Searching for the truth	Students are taught how self-belief is often obscured by negative expectations that have been internalised in the past, and are embodied in the way we talk to ourselves (self-talk). The unit teaches that students can change the way they think about themselves by taking responsibility for *how* they think about themselves (by changing their self-talk). Students are encouraged to move from an external to an internal locus of control.
3	We are what we think	Students are taught that thoughts are controllable by explicitly setting goals they want to achieve. A series of examples are given of famous people – Churchill, Einstein, etc. – who were written off as 'no-hopers' by other people.
4	Look inside your mind	This unit teaches that students have control over what they put in their mind. They are encouraged to identify problems with their current self-image/perceptions and create an alternative and more positive set of expectations.
5	Change your attitude	Self-image/perceptions are made up of a range of positive and negative habits and beliefs. This unit teaches that changing the self-image/perceptions involves identifying negative habits and attitudes, and changing them into positive habits and beliefs. Students discuss current attitudes towards school subjects, and the differences in the way they think about subjects they like and dislike.
6	Talking to yourself	Self-talk controls self-image/perceptions, and self-image/perceptions control performance. Changing self-talk changes self-image/perceptions, and therefore performance. Students are taught that they ways they talk to other people can also influence that person's self-image/perceptions.
7	You're worth it!	Self-esteem can have a large impact on performance. Students are encouraged to take control of they feel about themselves and to control their self-talk. This involves identifying negative or problematic aspects of the current self, and finding solutions to them by making affirmations – stating the desirable state as if it were true. General goals, educational aspirations, and future employment plans are discussed. Students are also told that how they make others feel about themselves can have a huge impact on that person's performance.
8	Stretching your comfort zones	Students are encouraged to become comfortable with their desired solutions by making them as concrete as possible. This unit offers a number of exercises that give students strategies for setting goals that go beyond their current aspirations – to 'stretch their comfort zones'. This involves visualisation and mental rehearsal of what it is like to be in that goal state.
9	How to be successful	Goals need to be as explicit and concrete as possible. The more visualisable and concrete the goal, the greater the influence it will have compared to the current state. Students are encouraged to reinforce the feelings and beliefs they have when they are in a desired positive mental state (when they are experiencing confident they can do something, for example), and to dispute the feelings and beliefs they have when they are in a negative mental state.
10	Setting goals	Goal-setting needs to be explicit and deliberate. Students are encouraged to write down goals and, particularly, affirmations and to make them concrete by visualising them. A formal set of 11 rules are given for constructing affirmations, and a series of practical exercises are carried out. Students are encouraged to write affirmations on a regular basis.
11	Imagine your future	Affirmations need to be internalised by repeating them twice daily. Students are taught the formula: I (Imagination) x V (Vividness) = R (Reality). Growth requires that visualisation of goals must be stronger than visualisation of current reality. This 'imprinting' of affirmations helps make them a more powerful influence on behaviour. Students complete an exercise in which they imagine their life-situation ten years in the future.
12	Motivating yourself	Students are told it is their responsibility to take control of their own lives, and that they should not rely on other people. They are encouraged to act for intrinsic reasons (positive motivation), not to please others (extrinsic, negative motivation). Students complete practical team exercises designed to demonstrate self-motivation.

The central focus of the GFI intervention is the *Self-Talk Cycle* (see Figure 4.1): positive self-image and self-perceptions encourage good performance and increased motivation;

good performance provides a stimulus for positive self-talk; and positive self-talk increases or maintains positive self-image and self-perceptions. This captures the self-perception–performance/motivation relationships discussed in earlier chapters, but introduces the possibility of directly manipulating self-perceptions. To support self-talk, students are taught to write and rehearse self-affirmations – short positive statements that specifically articulate a new description of how they would like to be. The more fully imagined the description, the greater the power it has relative to one's current self-belief. For the programme to be effective, writing and rehearsing affirmations needs to be a regular and frequent activity. There is also considerable focus on raising aspirations, with students being encouraged to set, visualise and rehearse personal and educational goals. Strategies are taught for achieving these goals. Students are told that reaching these goals is within their own control, and that change can only really be achieved through increasing intrinsic motivation, and not by acting to please parents and teachers. They are also taught that their goals are more likely to be achieved if they believe in their own ability, and that raising such beliefs comes from the use of positive self-talk. *Go For It!* is therefore aimed at helping young people face challenges and decisions by showing them the importance of having positive self-perceptions and teaching them how to develop effective thought patterns.

Figure 4.1 The *Go For It!* Self-Talk Cycle



The GFI programme takes its theoretical roots from an eclectic mix of psychological backgrounds and is endorsed by two of the worlds leading researchers into cognitive psychology: Dr. Albert Bandura (Self-Efficacy Theory) and Professor Martin Seligman (Learned Optimism – the idea that optimistic thinking can be learned). There is much theoretical and empirical support for the principles on which GFI is based. For example, research suggests that encouraging people to set learning goals – one of the major aims of the GFI programme – facilitates the development of self-efficacy, self-concept, intrinsic motivation, intrinsic interest, competence and academic achievement (e.g. Bandura & Schunk, 1981; Pajares, Britner, & Valiante, 2000; Tanaka & Yamauchi, 2001; Zimmerman, Bandura, & Martinez-Ponz, 1992). It has been shown that more specific goals that are set for the short-term (proximal goals), and that are perceived as challenging but attainable, are more likely to enhance self-efficacy perceptions, motivation and skill development. Such goals offer clear standards for progression and provide evidence of growing mastery. Thus, individuals can compare their progress against their goals. General, long-term goals (distal goals) are not seen as attainable and are more likely to reduce self-efficacy and demotivate students (Bandura & Schunk, 1981; Manderlink & Harackiewicz, 1984; Schunk, 1995). Schunk (1995) also suggests that the enhancement of self-efficacy is more likely if students have a strategy towards succeeding (i.e. a means for performing successfully). Furthermore, if that strategy is visualised and verbalised as it is applied, this can further enhance self-efficacy. This is because it focuses attention on features of the task, helps students work systematically, and assists encoding and retention of information. Students that have been encouraged to set their own goals, as opposed to having them set by someone else, exhibit more positive self-efficacy, increased competence and more commitment to achieving their goals (Schunk, 1985).

The GFI programme aims to enhance self-perceptions and academic performance/ aspirations. It also aims to change attributional thinking such that students develop more positive, optimistic thought patterns. Research examining the causal link between self-perception and academic functioning has been discussed earlier. Research also suggests that students with more favourable (or optimistic) causal attributions towards success and failure would be more likely to exhibit higher self-efficacy and self-concept/self-esteem (e.g. Bank & Woolfson, 2008; Bong, 2004; Cheng & Chiou, 2010; Schunk & Gunn, 1986; Stipek, 1993; Tennen & Herzberger, 1987). Attributions have also been shown to be a mediator between past academic performance and self-efficacy, and to be related to persistence, intrinsic motivation and performance (e.g. Ayres & Cooley, 1990; Gibb, Zhu, Alloy, & Abramson, 2002; Linnenbrink & Pintrich, 2002b; Lyden, Chaney, & Danehower, 2002), although some research has also suggested that attributions do not contribute to academic performance once past performance has been accounted for (Bridges, 2001). Attributions are seen as one of the ways that self-perceptions are formed. They are reciprocally related with self-perceptions, such that attributions influence self-perceptions, and in turn self-perceptions influence subsequent attributions (Stajkovic & Sommer, 2000; Stipek, 1993). Because self-perceptions affect thought patterns that are self-aiding or self-hindering, individuals with positive self-perceptions find it easier to control intrusive negative thought patterns (Bandura, 1989). Bandura (1982) argues that attributional analysis is essential for the effects of specific cues (past performance, for example) to influence self-perceptions. Taken together, this research suggests that changing students' attributional thinking would have positive effects on self-perceptions and academic functioning.

It has been suggested that attributions are susceptible to retraining (Perry, Hechter, Menec, & Weinberg, 1993). Research indicates that positive self-praise or self-talk can 'anchor' an individual's causal attribution to unstable, external factors (effort, for example), rather than to stable, internal factors, such as ability. For example, Mushinski-Fulk and Mastropieri (1990) present a programme aimed at improving student attitudes, self-beliefs and achievement through attribution retraining. They suggest that attribution retraining should be paired with study and learning strategy instruction (for example, in test-taking strategies). They also suggest that strategy-attribution training should emphasise the importance of attributing success to controllable causes (effort and use of strategy, for example), provide opportunity for practicing strategy application, help students to develop self-monitoring procedures for their own behaviour, and encourage positive and guided self-talk. Positive self-talk and self-affirmation are actively encouraged as a means of students controlling their behaviours and self-beliefs. This is consistent with aspects of the GFI programme which encourage students to use self-praise and positive self-talk to dispute negative, pessimistic thoughts and attributions, and replace them with more positive, optimistic ones.

Research questions, however, whether self-perceptions can be altered at all. As discussed in Chapter 1, there is a theoretical argument that both self-esteem and self-concept are highly resistant to change and therefore do not lend easily to experimental manipulation

(Craven et al., 1991; Marsh & Yeung, 1998). Despite this, there is some evidence of positive effects as demonstrated by meta-analyses undertaken in this area (e.g. Haney & Durlak, 1998; Hattie, 1992; O'Mara et al., 2006). In a clinical context there is evidence that a range of therapies are effective in increasing self-esteem/self-concept in children with emotional or behavioural difficulties (Haney & Durlak, 1998). There is also evidence that classroom interventions can result in improved self-esteem/self-concept, and that interventions are particularly effective when they are focussed on specific domains (O'Mara et al., 2006). Studies in real-world educational contexts have, however, been rare, and evidence is equivocal.

Research indicates that self-efficacy perceptions are receptive to intervention (Schunk, 1983a, 1983b). Self-efficacy intervention studies in real-world educational settings are even less prevalent than those exploring self-esteem or self-concept, however. This might be due to the relative lack of emphasis within educational contexts on improving self-efficacy compared to self-esteem. It has been suggested that because of how self-efficacy is developed in childhood (via context-specific mastery experiences), it demonstrates lower stability than self-esteem or self-concept, and is therefore more susceptible to intervention (Pajares & Graham, 1999). The stability of self-efficacy has rarely been tested, however.

There is evidence to suggest that educational interventions using training in self-praise and positive self-talk, for both children and adolescents, impact on self-perceptions (e.g. Barrett et al., 1999; Craven et al., 1991) and motivation (Callicott & Park, 2003; Schimel, Arndt, Banko, & Cook, 2004). Outside of education, mental imagery and self-talk strategies have been widely used to increase self-belief and performance in sports, modify arousal levels, and decrease susceptibility to maladaptive thoughts (e.g. Beauchamp, Halliwell, Fournier, & Koestner, 1996; Hardy, Hall, & Hardy, 2005; Hatzigeorgiadis, Theodorakis, & Zourbanos, 2004; Mamassis & Doganis, 2004).

A similar programme to GFI, which has been widely used in Australian schools for adolescents and pre-adolescents – *Bright Ideas: Skills for Positive Thinking* (Brandon & Cunningham, 1999a, 1999b)[35] – has been demonstrated to have effects on self-perception and achievement outcomes, as well as on other psychological variables. Based on Seligman's (1995) work on optimistic thinking, the *Bright Ideas* programme was designed to facilitate the development of optimistic thinking skills in order to foster positive

[35] The Bright Ideas website can be found at http://www.kidsmatter.edu.au/programs-guide/bright-ideas/

behavioural outcomes. It was based around four basic principles – listening to one's own self-talk, evaluating the accuracy of that self-talk, generating alternative thinking and attributions, and challenging extreme negative (or catastrophic) thinking – that are administered over eight weekly 60-90 minute sessions. Consistent with the GFI programme, learning is facilitated using stories, cartoons, hypothetical examples, practice and role play. Also consistent with GFI, one of the main tenets of the programme is that children are taught to dispute negative self-talk and attributions. *Bright Ideas* has been found to result in significantly enhanced coping mastery, coping self-efficacy (defined as the degree of control over one's internal state of being), more optimistic attributions, and significantly reduced reliance on non-productive coping behaviours, including self-blame, worry, and ignoring the problem (e.g. Brandon, Cunningham, & Frydenberg, 1999; Craig, 2004; Cunningham, 2002a, 2002b; Cunningham, Brandon, & Frydenberg, 1999, 2002; Cunningham & Frydenberg, 2000). Effects remained when control groups were incorporated into the studies. These findings suggest that GFI, with its similarity to the *Bright Ideas* programme, might have effects on self-efficacy. However, the effects of *Bright Ideas* on self-esteem, self-concept, or the types of academic outcomes studied here, were not assessed. The fact that *Bright Ideas* effects more optimistic attributions and less negative thinking suggests that GFI might also result in these types of effects. In turn, this might positively impact on the self-perception and academic factors targeted here.

Both the GFI and the *Bright Ideas* programmes are embedded within Ellis' Rational Emotive Therapy techniques (RET; Ellis, 1962, 1975), articulated in classroom settings as Rational Emotive Education (REE; Ellis, 1998). Rational Emotive Education aims to develop students' sense of control over thoughts, feelings and behaviours (for example, increasing perceived self-efficacy and self-concept). Students are encouraged to dispute irrational beliefs in order to achieve more realistic and functional appraisals of experiences/situations. The efficacy of Rational Emotive Education has been demonstrated across a wide range of student populations (Hajzler & Bernard, 1991). Furthermore, these types of cognitive behavioural interventions have been shown to be more effective than interventions using non-behavioural techniques (Durlak & Wells, 1997). *Bright Ideas* was also directly modelled on the cognitive attribution component of the *Penn Prevention Program*: a school-based intervention aimed at promoting resilience, and preventing depression and pessimistic attributions in adolescents of 10 to 13 years of age (Jaycox, Reivich, Gillham, & Seligman, 1994; Seligman, 1995; also known as the *Penn Optimism*

Program; Shatte, Reivech, Gillham, & Seligman, 1999). This programme was developed using theoretical considerations and randomised controlled trials have been shown it to be very effective.

This research, therefore, offers a real-world context in which to examine whether self-perceptions can be enhanced. To the extent that there are positive intervention effects on self-perceptions, this research also offers the opportunity to examine the causal role of self-perceptions in academic functioning. Research into the 'causal' ordering of self-esteem and self-concept has been criticised for being based on cross-sectional studies that have failed to control for prior academic performance and ability, rather than longitudinal designs – causal relationships cannot be determined when self-perceptions and outcome measures are taken at the same time. Causality can be better explored by experimentally manipulating self-concept/self-esteem and observing the ensuing changes in performance. Despite this, experimental research into the causal ordering of self-concept/self-esteem and academic performance is limited, as is that exploring the causal ordering of these self-perceptions in relation to other academic outcomes. Few interventions designed to manipulate self-esteem/self-concept actually succeed in doing so, and where changes are achieved, few studies have examined whether these then result in improved performance. An early review (Scheirer & Kraut, 1979) failed to find evidence of performance benefits for self-concept training. Later evidence suggests that attempting to increase self-esteem can have a negative impact on academic performance (Forsyth et al., 2007).

Laboratory studies in which self-efficacy is artificially manipulated do tend to show performance effects as well as enhanced motivation (Bandura & Locke, 2003; Boyer et al., 2000), but there is also evidence to suggest that in some contexts increasing self-efficacy can result in a decline in performance (e.g. Vancouver et al., 2001). Experimental research into the causal role of self-efficacy in relation to other academic outcomes appears non-existent. It is not clear, therefore, that where an intervention results in improved self-efficacy, this then actually benefits academic functioning.

This step of the research also explores whether the amount of variance explained by self-perceptions in the prediction of academic outcomes is worth trying to manipulate self-perception for, i.e. whether it results in real-term improvements in academic functioning. The regression analyses undertaken in Chapter 3 indicate that self-efficacy and self-concept explain very low amounts of variance in predicting some of the academic outcomes. Self-esteem explains lower amounts of variance still. These results suggest that, while the regressions predict significantly and it might thus be possible to intervene to change self-perceptions, the subsequent changes in academic outcomes might not be enough to have any significant benefit in real terms. The regression results show, for example, that the First-Order Competency structure gives a relatively large prediction effect for Preference for Challenge Motivation (explaining 25.9% additional variance), but gives a small effect for English (only 1.7% additional variance). Self-Efficacy for Self-Regulated Learning was the self-perception factor that made the most significant contribution to the model for both outcomes. This suggests that there is more scope for intervening to positively influence this type of self-efficacy with the ultimate aim of improving Preference for Challenge Motivation, but that there is only very limited scope for doing so to improve English performance. This type of self-efficacy also provides an independent contribution to GCSE Science. The overall model explained 6.2% additional variance, which is not negligible in an educational context. This suggests that there might also be scope for increasing Self-Efficacy for Self-Regulated Learning in order to facilitate improvements in science ability.

4.1.1 Research questions

The analysis presented in this chapter was therefore motivated by a lack of knowledge of the benefits of training school-age students in strategies for building positive perceptions of the self. The research concentrated on experimentally manipulating self-perceptions using the GFI intervention. Any resulting changes in self-perception were then assessed. This chapter was also motivated by a lack of knowledge about whether self-perceptions in some way influence the development of positive academic functioning. Therefore, changes in subsequent academic functioning were also explored. Changes in both a self-perception variable and an outcome measure might indicate that the self-perception variable has a causal influence over the associated academic outcome. To add to previous research in this area, the analyses controlled for the influence of past academic performance, gender, special educational needs, and socio-economic status. Consistent with the Chapter 3 analyses, this chapter concentrates on three particular academic outcomes: aspirations, intrinsic motivation and academic performance.

The main research questions to be answered are:

(1) Does the *Go For It!* intervention lead to improved self-perceptions?

(2) If so, which self-perception – self-esteem, self-concept, self-efficacy, or self-competence – is more susceptible to intervention?
(3) Does the intervention lead to positive changes in academic outcomes?

Taking the results from Chapters 2 and 3 into account, five measures different self-perception measures were utilised: self-Esteem (SPPA Global Self-Worth subscale), self-efficacy (the MSPSE), self-concept (the SPPA self-concept subscales), and self-competence (First-Order Competency and Second-Order Competency). The analyses in Chapter 2 showed that the Competency structures were the most reliable, and provided the most coherent representations of the underlying nature of the data. Of the structures examined in Chapter 3, the MSPSE and SPPA were the most valid single-construct measures for prediction. Utilising the MSPSE and SPPA allows for a comparison of self-efficacy and self-concept constructs in relation to whether they can or cannot be manipulated. Utilising the Competency measures makes it possible to determine whether perceptions of *self-competence* (as opposed to self-efficacy or self-concept) can be manipulated. It would be more practical for future research to administer aggregate self-competence measures rather than use aggregate structures such as the combined MSPSE/SPPA, which has a greater number of items. It would make little sense to administer aggregate measures that have 82 or more items when as much predictive utility can be obtained with a 71-item instrument. Using the Competency measures also makes it possible to determine whether any changes in self-perception when measured at a domain-specific level are different than those demonstrated when using more global measures.

On the basis of previous research and the Chapter 3 findings, it was expected that:

(1) Self-perceptions can be enhanced.
(2) Self-efficacy and self-competence would evidence greater change in response to the intervention than self-esteem or self-concept. This is because developmentally, self-esteem and self-concept are seen as being more stable and more resistant to change.
(3) Self-esteem would be less subject to change because, developmentally, it is seen as the most stable of the three constructs.
(4) Given the hypothesised causal relationship between self-efficacy/self-concept and academic performance presented in the literature, and given the relationship evidenced between the academic outcomes examined here and some aspects of

self-efficacy, self-competence and self-concept in Chapter 3, it was expected that any observed changes in these constructs would be accompanied by some positive change in the academic outcomes.

4.2 Method

4.2.1 Design

The design has already been described in Chapter 2. In summary, two groups of Year 10 students were tested: students who participated in GFI and students who did not participate in GFI. The latter group acted as a control. The evaluation was prospective, involving baseline, post-intervention (post-test), and follow-up testing of both the intervention and control participants. At all three occasions students were tested on aspects of self-related perceptions, motivation and aspirations.

In addition, post-intervention academic performance was also assessed using curriculum assessments (GCSEs) taken the year immediately following the intervention (as described in Chapter 3). Participants' evaluations of the intervention were also collected at post-test and follow-up (discussed later in this chapter). At this time, students were also asked about the extent to which they had adopted the positive self-talk strategies taught during the programme.

4.2.2 Sample

The research presented in the chapter was based on a subsample of the 'full sample'. This sample is discussed in Chapter 2, where it is referred to as the 'intervention' sample. This is a longitudinal dataset with data included for each of three time periods: baseline, post-test and follow-up.

4.2.3 Programme implementation

In all intervention schools GFI was delivered to whole Year 10 cohorts by trained facilitators, and all of these schools covered the content outlined in Table 4.1. There was, however, some school-by-school variation in how GFI was implemented. In four schools, facilitators were members of the existing school staff who had previously completed GFI facilitator training. However, one school (School C1) did not have suitably trained staff and so employed external facilitators. Three schools delivered GFI as a short, intensive course, with between 10 and 13.5 hours of instruction over two or three days. One of these

(School A1) took the whole Year 10 cohort to a location away from school premises to deliver the programme, another (School B1) took a high proportion of students (about 65%) off school premises, and taught the remainder on-site, and the third school (School C1) ran the intervention entirely on-site. The other two schools (Schools D1 and E1) delivered GFI on-site with sessions distributed across a term, either as three four-hour sessions or as weekly one-hour sessions replacing normal PHSE lessons. All schools in the intervention sample delivered all 12 units of the GFI programme. There was some variation across schools in the extent to which GFI content was revisited after students had completed the course (i.e. between post-test and follow-up). Table 4.2 shows the pattern of implementation of the programme and the revisits employed in the different schools.

Table 4.2 Patterns of implementation of *Go For It!* in different schools

School	Pattern of implementation	Off school premises?	External facilitators?	Revisits?	Implementation group
A1	3-day intensive / 4½ hours per day	Yes	No	Yes – all through the rest of Years 10 and 11. Themes referred to during registration and in assembly	Intensive with revisits
B1	3-day intensive / 4 hours per day	Yes, 6 groups No, 3 groups	No	Nothing formal but brought in to life-skills programme by most staff	Intensive with revisits
C1	2 day intensive / 5 hours per day	No	Yes	No – no internal facilitators in the school	Intensive, no revisits
D1	3 x 4 hour sessions spread across term	No	No	Yes – 2 x 4½ hour sessions – one before mock exams and one before final GCSE exams	Dispersed, some revisits
E1	1 hour per week for one term	No	No	During the year in life-skills lessons & registration. Revision prior to GCSEs used the 'best bits'. Affirmations used as visual stimuli around school. Philosophy embedded in school.	Dispersed, some revisits

As can be seen from Table 4.2, three schools made formal and quite extensive reference to GFI content in the period between post-testing and follow-up (Schools A1, D1 and E1); GFI programme themes were incorporated into assemblies, registration sessions and PHSE classes for these schools. In School E1 this was reinforced by notices and posters around the school. In the fourth school (School B1), reference to GFI content was less formal but brought into PHSE classes. In these four schools, GFI programme content was also explicitly returned to in Year 11 (i.e. after follow-up testing but before final GCSE curriculum assessments). This occurred formally in two schools (Schools D1 and E1), with dedicated day-long sessions prior to mock and final examinations, and less formally in the other two (Schools A1 and B1). The one school that did not return to the intervention content in any systematic way was the school that did not have trained facilitators on staff (School C1). Taking account of the patterns of implementation for each school, and the number of on-site sessions and revisits, three different implementation groups were identified: 'intensive with revisits', 'intensive with no revisits', and 'dispersed with some revisits'.

Each of the intervention schools ran GFI for all Year 10 students in the 2003/2004 academic year. The GFI intervention was implemented at varying times of the year with dates for the first session ranging from mid December (the first term of Year 10) to early June (towards the end of Year 10). Testing followed near-identical patterns in intervention and control schools, with closely matched testing dates (implementation and testing dates are shown in Chapter 2: Table 2.1). Intervals between post-test and follow-up were dependent upon when schools were able to give access and varied between 17 and 24 weeks. Intervals were, however, similar in control and intervention conditions (mean for intervention = 21 weeks, mean for control = 20 weeks).

4.2.4 Measures

The intrinsic motivation, aspiration (educational and occupational), and academic performance measures (Key Stage 3 SATs and Year 11 GCSEs), and the socio-economic status and SEN indicators have been discussed in Chapter 3. The other measures in this chapter are discussed below.

Self-efficacy, self-concept, self-competence and self-esteem

Self-efficacy was measured using all nine domains of the MSPSE. Self-concept was measured using all eight competence domains of the SPPA. Self-esteem was measured using the Global Self-Worth subscale of the SPPA. Self-competence was measured using two separate indices derived from the factor analyses of the MSPSE and SPPA: First-Order Competency (10 domains) and Second-Order Competency (four domains). All of these measures have been introduced in previous chapters.

For the MSPSE, SPPA and First-Order Competency measures, individual item scores within each factor were added together and averaged to give a final score to be used for subsequent analyses. Factor scores for the Second-Order Competency measure were derived by averaging the First-Order Competency factor scores relative to each factor.

Consistent with the analyses in previous chapters, all responses were scored from 1 to 28, with larger scores indicating higher levels of self-perception.

Intervention process questions

At post-test and follow-up testing sessions students completed an intervention process questionnaire that measured their enjoyment and understanding of the sessions, and extent of engagement with the strategies taught. Two forms of the questionnaire were devised (see Appendix C.1). Questions given at post-test asked about the extent to which students had enjoyed the course and whether or not they felt what they had learned would be useful. For example, ‘Did you enjoy the *Go For It!* sessions?’ Students were also asked about their intentions to use each of the strategies covered in the course. For example, ‘How often are you likely to write your affirmations?’ The same items were repeated at follow-up but were reworded to reflect the fact that students had now had an opportunity to put what they had learnt into practice. For example, items about strategy use were reworded so as to ask about students’ behaviour rather than their intentions: *How often have you done…?*, rather than *How often are you likely to…?*

Students were given six questions. Within these were a number of sub-items. Questions 1 – 3 were single response items with students responding on a 7-point Likert scale. Question 4 was also a single response item which used a 6-point Likert scale. Question 5 asked students to indicate whether each of 12 individual items was an example of positive or negative self-talk. Correct responses were scored ‘1’ and incorrect responses were scored ‘0’. These scores were then added together to give a final score out of 12. Question 6 asked students to respond on a 5-point Likert scale to nine individual items designed to establish students’ use of programme strategies. The nine item scores were then averaged to give a mean score for subsequent analyses.

4.2.5 Procedure

The procedure has been discussed in Chapter 2.

4.2.6 Statistical analysis

The analyses in this section of the thesis were conducted using SPSS. They involved running a series of univariate and multivariate analysis of variance (ANOVA) tests.

Self-efficacy, self-concept, self-competence and motivation

To take account of the multidimensional nature of these constructs, analyses were by repeated measures multivariate analysis of covariance (MANCOVA). Time of test (baseline, post-test, follow-up), condition (control, intervention), gender and special educational needs status were used as independent variables, and the self-perception/motivation measure/factors were used as dependent variables. Condition, special educational need (SEN) and gender were held as between-subjects factors. Free school meal eligibility, ACORN score, and the three prior academic performance variables (KS3 Mathematics, English and Science) were entered as covariates. Separate analyses were conducted for baseline vs. post-test, and for baseline vs. follow-up, in order to establish whether there were, respectively, short- and long-term effects of the programme. Separate MANCOVAs were conducted for self-efficacy, self-concept, motivation, and first- and second-order competence. A total of 34 relevant dimensions were therefore examined.

For each measure, a model was tested that comprised the time-by-condition interaction (to establish whether there were different patterns of means across pre- post- and follow-up tests in the intervention and control groups), a three-way time-by-condition-by-gender interaction, and a three-way time-by-condition-by-SEN interaction (to establish whether effects of the intervention, if any, were moderated by gender or special educational need). A four-way time-by-condition-by-SEN-by-gender interaction was also specified (to establish whether effects of the intervention, if any, might be moderated by *both* gender and special educational need). Multivariate results were reported using Wilks' Lambda, which is the test traditionally used where there are more than two groups formed by the independent variables (Garson, 2009). Significant multivariate results were explored using univariate analysis of covariance (ANCOVA) tests and profile plots (which present estimates of the mean scores in graphical format), both of which are produced as part of the MANCOVA output. Univariate results were reported using Greenhouse-Geisser (Maxwell & Delaney, 2004, recommend always reporting Greenhouse-Geisser for repeated measures ANOVA as it does not assume sphericity; checks for violations of sphericity are discussed in Appendix C.2).

Self-esteem and aspirations

The self-esteem and aspiration measures were not comprised of scores on multiple factors, therefore analyses were by repeated measures analysis of covariance (ANCOVA), with time of test (baseline, post-test, follow-up), condition (control, intervention), gender and special educational needs status as independent variables, and the self-esteem/aspiration measure as the dependent variable. Condition, special educational need and gender were held as between-subjects factors. Free school meal eligibility, ACORN score, and KS3 Mathematics, English and Science were held as covariates. A model was tested that comprised the time-by-condition interaction, a three-way time-by-condition-by-gender interaction, a three-way time-by-condition-by-SEN interaction, and a four-way time-by-condition-by-SEN-by-gender interaction. Separate analyses were conducted for baseline vs. post-test, and for baseline vs. follow-up to examine short- and long-term effects of the programme on self-esteem and aspirations. Results were reported using Wilks' Lambda.

Academic performance

Analyses were by one-way univariate ANCOVA, with GCSE Mathematics, English or Science performance as the dependent variable. Condition, gender and SEN status were held as fixed factors, and free school meals eligibility, ACORN score and prior academic performance (KS3 scores in Mathematics, English and Science) were held as covariates. A model was specified that included the main effects of all factors (including covariates), two-way condition-by-SEN and condition-by-gender interactions, and a three-way condition-by-SEN-by-gender interaction.

Reporting the results

The multivariate MANCOVA results were reported as statistically significant if $p < .05$. Post hoc power analyses indicated that with this alpha level and sample size there was between an 86.5% and 95.4% chance of finding multivariate test-by-condition interactions with effect sizes of .045 or greater statistically significant, dependent on the self-perception construct (self-efficacy, self-concept or self-competence). This was slightly higher for motivation (power analyses achieved .968) (power analyses were conducted using G*Power v2 software; Faul & Erdfelder, 1992). A Bonferroni adjustment was applied to the alpha criterion for the univariate MANCOVA results to reduce the possibility of Type I errors due to multiple testing: a typical alpha criterion of .05 was adjusted to .01, and a typical criterion of .01 was adjusted to .002. An alpha level of .05 was used for all other tests. Post hoc power analyses for self-esteem, aspirations, and GCSE performance ranged from .946 to .998 across assessment periods, to achieve an effect size of .045.

The effect size reported here is partial eta squared (partial η^2). Partial eta-squared is defined as the proportion of total variance attributed to a factor, partialling out (excluding) other factors from the total non-error variance. Partial eta-squared is therefore the proportion of total variance accounted for by a factor plus the associated error variance. Partial eta-squared is different from eta-squared which is defined as the proportion of total variance attributed to a factor. Both eta-squared and partial eta-squared values range from 0 to 1. Partial eta-squared is normally higher than eta-squared (Brown, 2008; Pierce, Block, & Aguinis, 2004). These authors suggest that partial eta-squared is more appropriate for repeated measures designs and those that have multifactorial designs, such as MANOVA. The size of eta-squared is determined as .01 for a small effect, .059 for a medium effect, and .138 for a large effect (Clark-Carter, 1997; Cohen, 1988). There does not seem to be any formal classification for interpretation of partial eta-squared effect sizes, and typically, the eta-squared classification is used.

Additional analyses

The initial analyses indicated that there might be an effect of both gender *and* special educational needs status on findings. Therefore, the analyses above were repeated by gender (run separately for males and females). For each set of analyses, a model was specified that comprised the time-by-condition interaction and a time-by-condition-by-SEN interaction. Findings (multivariate, univariate and profile plots) were then compared across genders. Examination of the sample characteristics indicated that caution must be taken using this approach, however. Overall, there were only a small number of special educational needs students in the sample (see Table 4.3). Whilst the analyses by gender can give some idea of how gender and special educational needs status interact in the context of this intervention, the results must be interpreted with care. Henceforth, students with special educational needs will be referred to as such. Those students that do not have special educational needs status (the majority of the sample) will be referred to as 'mainstream' students.

Table 4.3 Number/proportion of special educational needs and mainstream students by gender: Control and intervention groups (N = 480)

Gender / Special educational needs status	Group		Total
	Control	Intervention	
Female: Special educational needs	7 (1.5%)	16 (3.3%)	23 (4.8%)
Female: Mainstream	139 (28.9%)	105 (21.9%)	244 (50.8%)
Male: Special educational needs	11 (2.3%)	10 (2.1%)	21 (4.4%)
Male: Mainstream	118 (24.6%)	74 (15.4%)	192 (40%)
Total	275 (57.3%)	205 (42.7%)	480 (100%)

The analyses above test the hypothesis that the GFI intervention will affect self-perception and/or motivation, aspirations, and academic performance, regardless of the GFI mode of implementation. It may be, however, that one of the modes of implementation is more effective than the others, and therefore differential effects of the intervention on the outcome measures might be hidden with the different implementation groups. These analyses were therefore repeated using the three separate implementation groups outlined earlier: 'intensive with revisits', 'intensive with no revisits', and 'dispersed with some revisits'. The analyses were also repeated separating the implementation schools into 'high delivery' and 'low delivery' implementation groups. The analyses by implementation group are discussed in more detail in the Results section.

4.2.7 Diagnostic checks

A number of diagnostic checks were run on the intervention data to ascertain whether the data adhered to the assumptions of the statistical tests. Diagnostic statistics were based on the assumptions required for MANOVA and repeated measures ANCOVA analyses because these provided the most rigorous checks of the data. The data were checked for sample size requirements, outliers, univariate and multivariate normality, linearity between pairs of dependent variables, multicollinearity and singularity, homogeneity of variance and homogeneity of variance-covariance matrices, sphericity, and influence of treatment on covariate measurement and reliability of covariates. These are summarised in Appendix C.2. The diagnostic checks were satisfactory and there was no need to make any adjustments to the data.

4.3 Results

In reporting the results, this section first presents analyses designed to determine whether GFI resulted in more positive self-perception. It then presents analyses designed to determine whether GFI resulted in elevated motivation and aspirations, and improved academic performance. Next, this section explores how the different types of programme implementation might differentially impact on the findings. Finally, the extent to which students' reported use of GFI strategies might impact on findings is examined. The mean scores and standard deviations for the various self-perception, motivation and aspiration variables at each time of testing for GFI and control groups are shown in Table 4.4 (those for academic performance are presented later). The ANOVA summary results are presented in Appendix C.3.

4.3.1 Effects of intervention on self-perceptions

As can be seen from Table 4.4, differences in mean scores were generally small. For self-efficacy, self-concept and self-competence there was a slight tendency for scores to increase from baseline to post-test, and again from post-test to follow-up. This general increase was, however, present in the control condition as well as in the GFI condition. There was therefore no indication from the pattern of mean scores that the increases in self-efficacy, self-concept or self-competence scores were greater for the GFI group than for the control group, or that participation in GFI resulted in significantly improved self-perception. In relation to self-esteem, for control students there was a very slight increase in self-esteem scores over the course of the study, but for intervention students, scores remained the same across testing sessions. The pattern of mean scores therefore gave no indication of any improvement in self-esteem as a result of participation in GFI. Statistical analyses that tested for significant differences between the groups are presented below.

Table 4.4 Mean and standard deviation self-perception, motivation and aspiration scores at baseline, post-test, and follow-up for intervention and control groups (standard deviations in parentheses). Figures taken from the full intervention sample (N = 480).

Measure / Variable		Time of testing					
		Baseline		Post-test		Follow-up	
		Control	Intervention	Control	Intervention	Control	Intervention
Self-efficacy							
B1	Enlisting Social Resources	20.21 (3.71)	19.43 (3.43)	20.53 (4.01)	19.72 (3.61)	20.82 (4.07)	19.91 (3.98)
B2	Academic Achievement	19.49 (3.50)	18.88 (3.26)	19.39 (3.62)	19.14 (3.45)	19.74 (3.47)	19.37 (3.64)
B3	Self-Regulated Learning	18.55 (3.65)	17.72 (3.81)	18.77 (3.65)	18.16 (4.17)	19.18 (3.72)	18.11 (4.08)
B4	Leisure-Time & Extracurricular Activities	17.42 (3.96)	17.35 (3.99)	17.72 (3.95)	17.41 (3.94)	17.88 (4.29)	17.88 (4.20)
B5	Self-Regulatory Efficacy	22.16 (4.13)	22.44 (4.29)	22.30 (4.38)	22.44 (4.58)	22.69 (4.11)	22.45 (4.51)
B6	Meet Others' Expectations	20.30 (4.00)	19.69 (4.43)	20.57 (4.39)	19.81 (4.37)	20.67 (4.64)	19.94 (4.55)
B7	Social Self-Efficacy	22.54 (3.55)	22.42 (3.70)	22.67 (3.79)	22.26 (3.66)	23.00 (3.87)	22.44 (3.62)
B8	Self-Assertive Efficacy	20.22 (4.74)	20.34 (4.55)	20.89 (4.56)	20.45 (4.44)	21.26 (4.48)	20.86 (4.72)
B9	Parental & Community Support	17.49 (4.88)	16.50 (4.95)	17.93 (5.15)	16.79 (5.14)	18.37 (5.30)	17.21 (5.57)
Self-concept							
H1	Scholastic Competence	20.93 (5.01)	20.48 (4.88)	21.32 (5.05)	21.41 (4.77)	21.45 (5.15)	21.10 (5.08)
H2	Social Acceptance	21.11 (4.86)	23.05 (4.66)	23.26 (4.80)	23.08 (5.07)	23.62 (4.96)	23.61 (4.43)
H3	Athletic Competence	17.32 (6.95)	16.40 (6.78)	17.41 (6.83)	16.73 (6.49)	17.72 (6.91)	17.12 (6.58)
H4	Physical Appearance	18.23 (6.82)	17.78 (6.83)	18.77 (6.74)	18.01 (6.58)	19.61 (6.67)	17.91 (6.52)
H5	Job Competence	21.81 (4.63)	22.00 (4.24)	21.73 (4.69)	22.08 (4.36)	22.42 (4.35)	22.45 (4.45)
H6	Romantic Appeal	17.92 (5.41)	17.39 (5.38)	18.58 (5.16)	18.83 (5.22)	19.22 (5.46)	19.07 (5.23)
H7	Behavioural Conduct	20.08 (5.30)	19.65 (5.25)	20.99 (4.94)	20.05 (4.99)	21.46 (4.89)	20.65 (5.08)
H8	Close Friendship	23.58 (4.80)	22.78 (5.59)	23.19 (5.46)	23.39 (5.07)	23.63 (5.23)	23.63 (5.22)
Domain-specific (first-order) self-competence							
CY1	Self-Regulated Learning Self-Efficacy	18.71 (3.67)	17.98 (3.93)	18.84 (3.75)	18.40 (4.15)	19.25 (3.79)	18.34 (4.12)
CY2	Athletics/Sports Competency	18.41 (6.18)	17.42 (6.02)	18.38 (6.10)	17.49 (5.71)	18.56 (6.13)	17.98 (5.82)
CY3	Friendship Self-Concept	23.60 (4.08)	23.17 (4.40)	23.41 (4.47)	23.39 (4.24)	23.82 (4.57)	23.85 (4.16)
CY4	Physical Appearance Self-Concept	17.60 (6.05)	17.12 (6.16)	18.19 (6.15)	17.68 (5.83)	18.97 (6.07)	17.61 (5.89)
CY5	Self-Regulatory Efficacy for Good Conduct	23.39 (4.67)	23.91 (4.78)	23.33 (4.76)	23.61 (4.91)	23.59 (4.56)	23.63 (4.85)

Table continued over the page…

Table 4.4 continued…

Measure / Variable		Time of testing					
		Baseline		Post-test		Follow-up	
		Control	Intervention	Control	Intervention	Control	Intervention
CY6	Job Self-Concept	23.27 (5.13)	23.33 (4.81)	23.22 (5.09)	23.37 (4.80)	23.97 (4.75)	23.93 (5.01)
CY7	Self-Assertive Efficacy	20.68 (4.01)	20.73 (4.06)	21.13 (4.08)	20.74 (4.07)	21.50 (4.20)	21.10 (4.33)
CY8	Mathematics/Science Competency	19.87 (4.43)	19.15 (3.89)	20.01 (4.40)	19.50 (4.09)	20.36 (4.20)	19.66 (4.26)
CY9	Communication/Arts Self-Efficacy	16.78 (3.92)	16.96 (4.08)	17.07 (4.03)	17.28 (4.20)	17.35 (4.09)	17.55 (4.38)
CY10	Good Conduct Competency	20.23 (4.42)	19.76 (4.48)	20.97 (4.20)	20.15 (4.31)	21.20 (4.36)	20.57 (4.32)
Second-order self-competence							
secCY1	Academic Competency	18.45 (3.22)	18.03 (3.12)	18.64 (3.35)	18.40 (3.45)	18.99 (3.36)	18.52 (3.57)
secCY2	Behavioural Conduct Competency	21.81 (3.89)	21.83 (3.82)	22.15 (3.89)	21.88 (3.88)	22.40 (3.79)	22.10 (3.92)
secCY3	Sports & Physical Appearance Competency	18.01 (5.14)	17.27 (4.98)	18.29 (5.16)	17.58 (4.62)	18.76 (5.13)	17.80 (4.67)
secCY4	Social Competency	22.51 (3.17)	22.41 (3.31)	22.59 (3.35)	22.50 (3.31)	23.10 (3.35)	22.96 (3.36)
Self-esteem		21.43 (5.41)	21.49 (5.53)	21.96 (5.32)	21.44 (5.05)	22.54 (5.09)	21.46 (5.35)
Motivation							
Mot 1	Independent Mastery	2.61 (0.73)	2.53 (0.76)	2.71 (0.66)	2.69 (0.73)	2.66 (0.71)	2.58 (0.73)
Mot 2	Internal Criteria for Success	2.40 (0.78)	2.51 (0.85)	2.59 (0.78)	2.60 (0.84)	2.63 (0.86)	2.67 (0.86)
Mot 3	Preference for Challenge	2.56 (0.73)	2.58 (0.77)	2.64 (0.67)	2.66 (0.74)	2.66 (0.70)	2.66 (0.74)
Aspirations							
Educational aspirations		4.07 (1.09)	4.08 (1.13)	3.97 (1.12)	4.04 (1.16)	4.10 (1.06)	3.98 (1.15)
Occupational aspirations		5.91 (1.78)	5.93 (1.68)	6.01 (1.82)	6.00 (1.61)	6.11 (1.76)	5.88 (1.78)

Note: *Control sample sizes*: Self-efficacy, self-concept, self-competence, self-esteem and motivation: N = 275; Educational aspirations, N = 260 to 267; Occupational aspirations, N = 219 to 230. *Intervention sample sizes*: Self-efficacy, self-concept, self-Competence, self-esteem and motivation: N = 205; Educational aspirations, N = 192 to 199; Occupational aspirations, N = 146 to 155.

Self-efficacy, self-concept and self-competence

Overall, there were only significant positive intervention effects for two aspects of self-concept: Close Friendship and Romantic Appeal. These were not for the whole group, however; positive effects were shown only for mainstream males. These were evident at follow-up but did not show up in the short-term.

Figures 4.2 and 4.3 show the mean scores for Close Friendship for mainstream and SEN males (the MANCOVA summary results are shown in Table C.3.4, Appendix C.3). For mainstream males, self-concept perceptions increased by 1.80 points over the course of the study, compared to a drop of just over half a point (0.6) for control students. There was also a *negative* effect for SEN males, with a drop in perception scores of 5.5 points for intervention students, compared to an increase of 1.3 points for the controls.

Figure 4.2 Close Friendship Self-Concept mean scores for male mainstream students: Baseline vs. follow-up

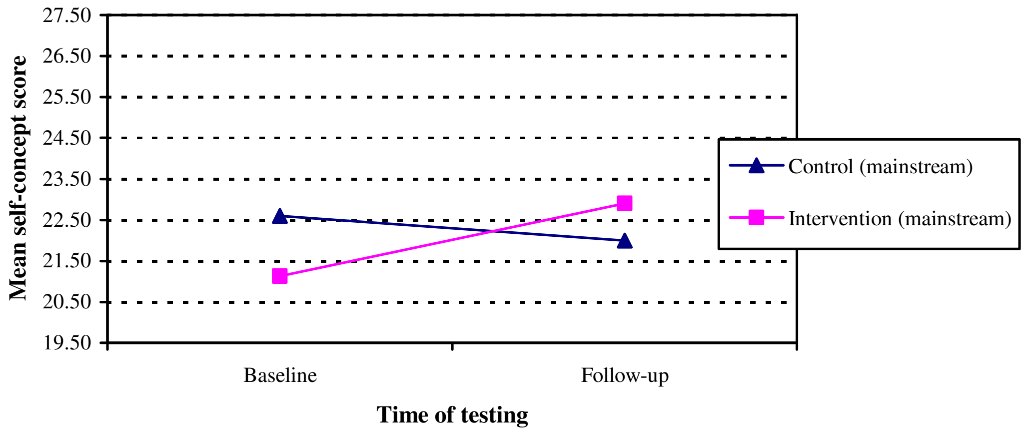
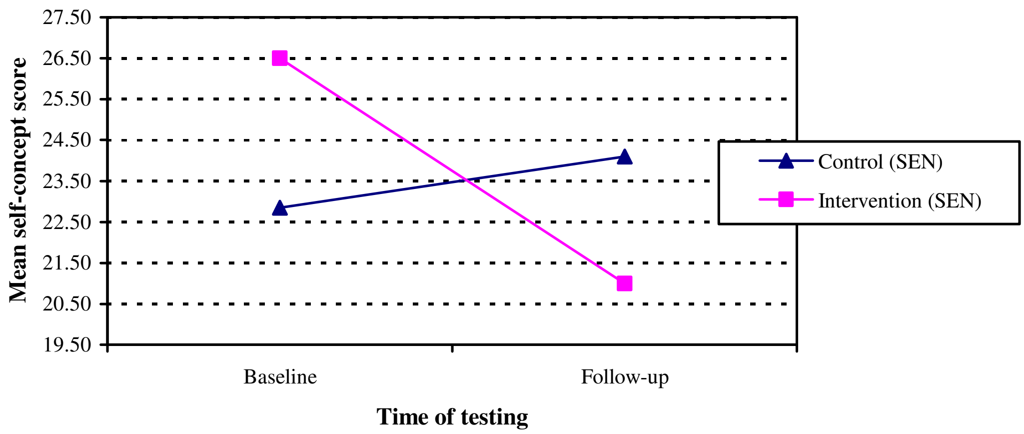


Figure 4.3 Close Friendship Self-Concept mean scores for male SEN students: Baseline vs. follow-up



Figures 4.4 and 4.5 show the mean scores for Romantic Appeal for mainstream and SEN males (summary results are shown in Table C.3.4, Appendix C.3). Self-concept scores for mainstream males increased by 1.9 points over the course of the study, whilst those for the control group rose by only 1.1 points. There was also a *negative* effect for SEN males: the increase for intervention students was negligible (only 0.3 of a point), whilst control students' scores increased by 1.4 points.

Figure 4.4 Romantic Appeal Self-Concept mean scores for male mainstream students: Baseline vs. follow-up

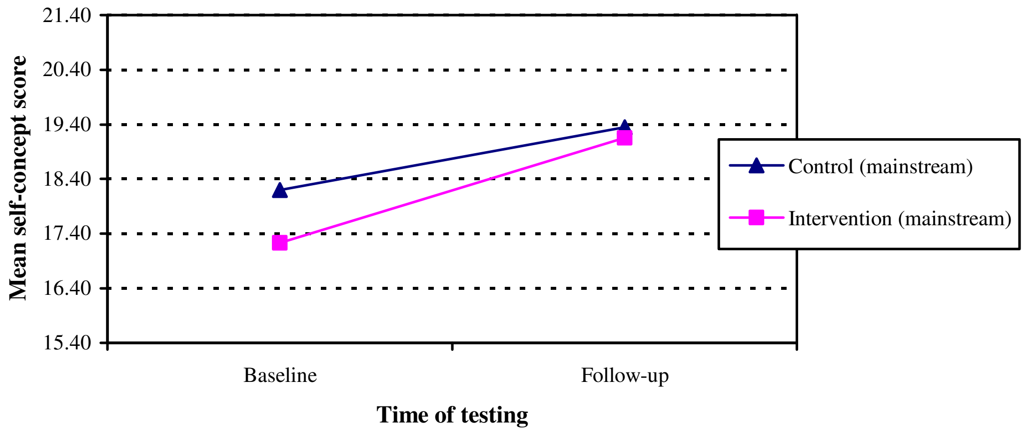
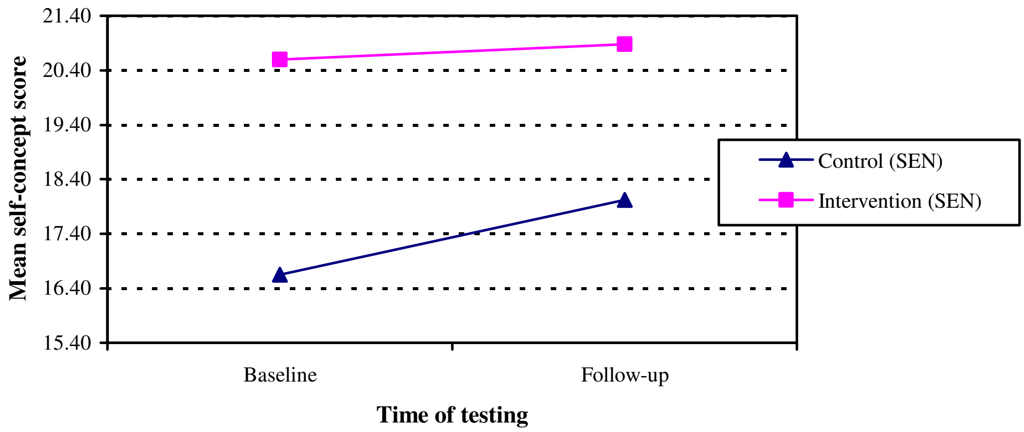


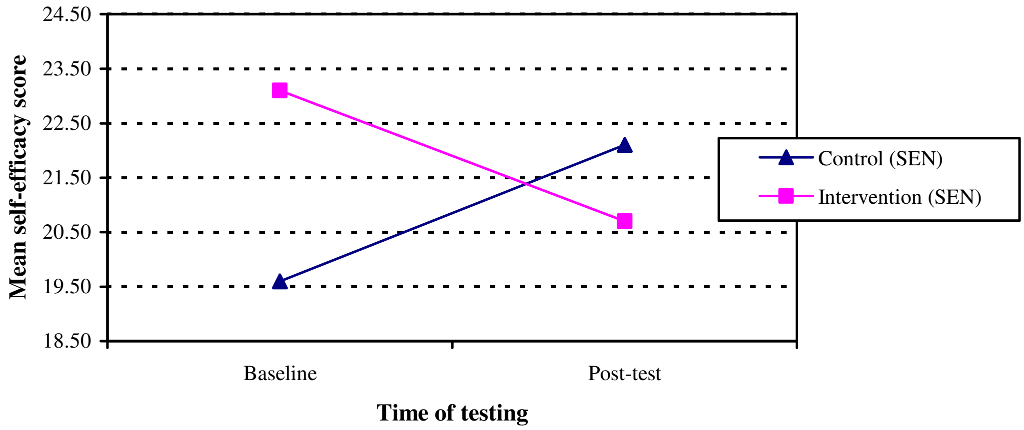
Figure 4.5 Romantic Appeal Self-Concept mean scores for male SEN students: Baseline vs. follow-up



There were a number of other significant negative effects associated with SEN students: for both males and females. SEN males evidenced significantly reduced self-perception in a number of domain-specific contexts (Social Self-Efficacy, Self-Assertive Efficacy, Physical Appearance Self-Concept, Job Self-Concept, and Good Conduct Competency), and three of the four more global contexts (Behavioural Conduct Competency, Sports and Physical Appearance Competency, and Social Competency).

The profile plot for Social Self-Efficacy (Figure 4.6) illustrates the type of negative effects that were demonstrated (summary results are shown in Table C.3.3, Appendix C.3). For the intervention group, SEN males' self-efficacy deteriorated by 2.4 points in the short-term, in contrast to those in the control group, whose perceptions improved by a similar amount (2.5 points). This effect was for baseline/post-test analyses; it was not evident at follow-up.

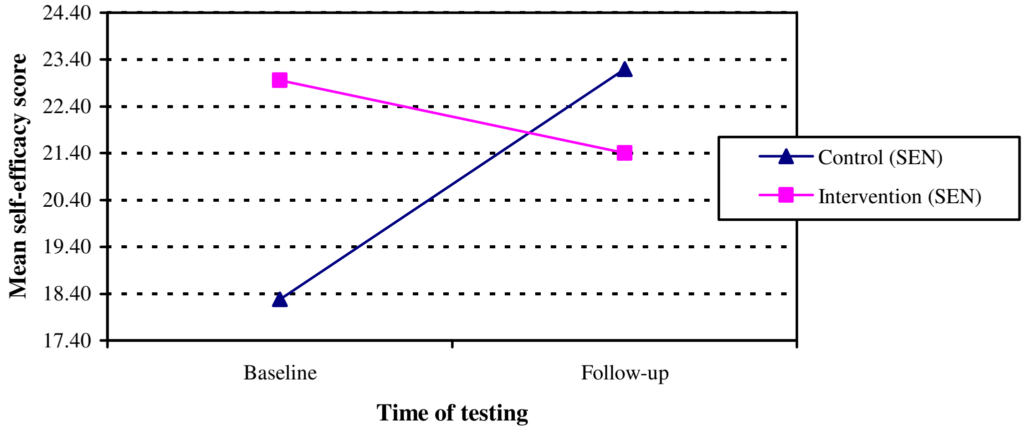
Figure 4.6 Social Self-Efficacy mean scores for <u>male</u> SEN students: Baseline vs. post-test



Female SEN students evidenced significantly reduced self-perception in three areas: Self-Efficacy in Enlisting Social Resources, Self-Regulatory Efficacy, and Self-Regulatory Efficacy for Good Conduct (domain-specific competency structure).

The profile plot for the latter of these factors (Figure 4.7) illustrates the type of negative effects that were demonstrated (summary results are shown in Table C.3.3, Appendix C.3). Female SEN students in the intervention group showed a reduction in Self-Regulatory Efficacy for Good Conduct of 1.6 points over the period of the study. In contrast, female SEN students in the control group showed an increase of 4.9 points. These effects were not seen at post-test.

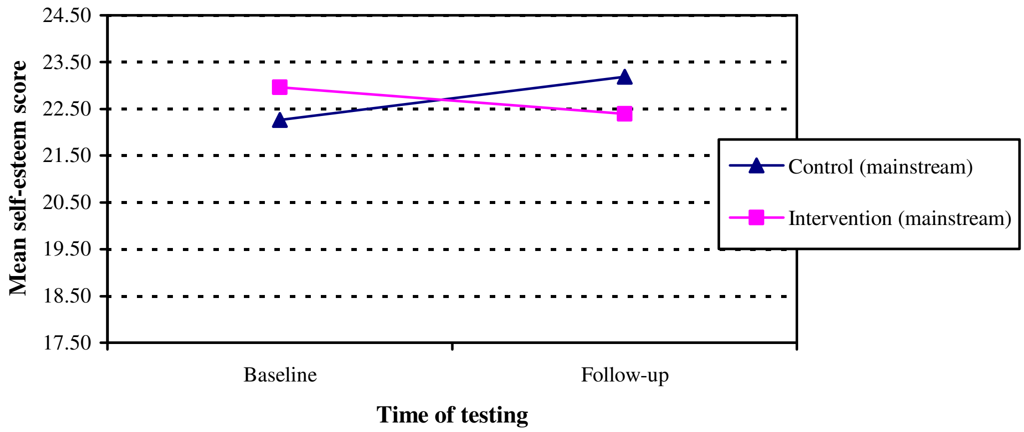
Figure 4.7 Self-Regulatory Efficacy for Good Conduct mean scores for female SEN students: Baseline vs. follow-up



Self-esteem

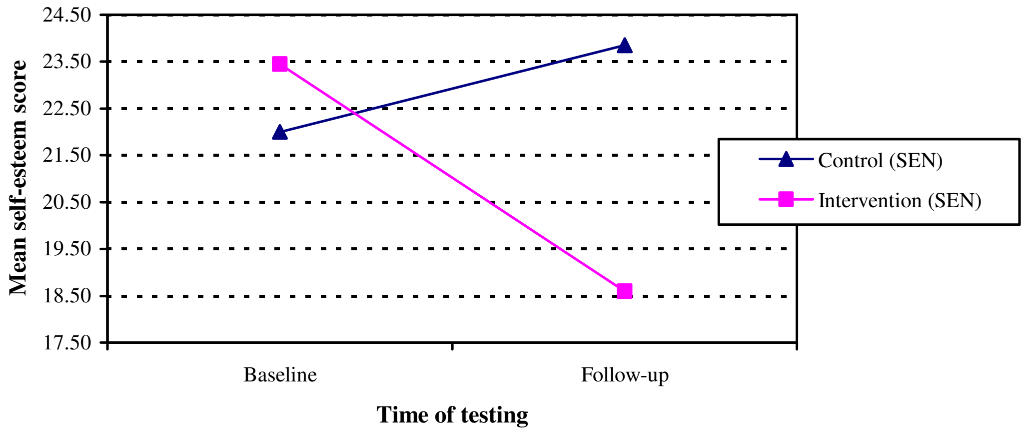
There was also a *negative* effect for SEN males for self-esteem – for baseline vs. follow-up. For this group, control students' self-esteem improved slightly over the time of the project (by 1.9 points), whilst intervention students' self-esteem deteriorated considerably (4.9 points). For mainstream male students, the drop was only by 0.6 points (see Figures 4.8 and 4.9; ANCOVA findings are presented in Table C.3.9, Appendix C.3)[36].

Figure 4.8 Self-Esteem mean scores for male mainstream students: Baseline vs. follow-up



[36] Repeating all the self-perception analyses but excluding the three KS3 performance variables as covariates revealed a similar pattern of results as those reported here. There were some slight differences in the self-concept and self-competence analyses in relation to some of the significant factors, interactions, and assessment periods but nothing to affect to the overall conclusions. Repeating the analyses but removing all covariates and all independent variables from the model, apart from time of test and condition, in the main revealed no significant time-by-condition or time-by-condition-by-other interactions for either assessment period, for the whole group, or by gender.

Figure 4.9 Self-Esteem mean scores for male SEN students: Baseline vs. follow-up



4.3.2 Academic intrinsic motivation

Table 4.4 gives the mean scores for the three indices of motivation at baseline, post-test and follow-up for GFI intervention and control students. Differences in mean scores were generally very small. Consistent with the self-efficacy, self-concept and self-competency analyses, there was a slight tendency for scores to increase from baseline to post-test, and again from post-test to follow-up. This increase was, however, present in the control condition as well as in the GFI condition. There was therefore no indication from examination of the mean scores that participation in the GFI intervention programme resulted in increased motivation.

The results of the statistical analyses for motivation are shown in Table C.3.10 (Appendix C.3). There was no significant multivariate or univariate time-by-condition or other interaction effects for either times of testing. The multivariate main effect of time was also not significant for either assessment period (baseline/post-test: $F(1, 411) = 1.97$, $p = .118$, partial $\eta^2 = .014$; baseline/follow-up: $F(1, 411) = 2.13$, $p = .095$, partial $\eta^2 = .015$), suggesting that overall there was no change in motivation. There were also no effects when the analyses were repeated separately for female and male students[37].

[37] Repeating the analyses for all students, but removing the three KS3 performance variables as covariates, revealed a significant multivariate three-way interaction between time, condition and gender. There were no significant univariate interactions, however. Neither were there any significant multivariate or univariate effects by gender. Analyses repeated for all students, but removing all covariates and all independent variables apart from time of test and condition from the model, revealed a main effect of time for both assessment periods, but no significant time-by-condition effects. Neither were there any significant time-by-condition effects when males and females were examined separately.

4.3.3 Aspirations

Table 4.4 gives the mean scores for educational and occupational aspirations at baseline, post-test and follow-up for GFI and control students. The means did not change across testing sessions for both groups; at each session all students demonstrated an educational aspirations score of around 4, whilst all students demonstrated an occupational aspirations score of around 6. There was therefore no indication of any increase in either of the aspirations as a result of participation in the GFI programme.

The results of the statistical analyses for aspirations are shown in Table C.3.11 (Appendix C.3). Consistent with the majority of the significant self-perception effects, there was a significant *negative* effect for male SEN students for both types of aspiration. For educational aspirations, this showed up for the baseline/post-test analyses, but was not sustained over the longer term: intervention students' scores dropped by around 1.5 points, whilst control students' scores stayed constant. For occupational aspirations, the negative effect was evident only for the baseline/follow-up analyses: intervention students' scores stayed relatively constant, whilst those for the control students increased by around 1.5 points[38].

4.3.4 Academic performance

Table 4.5 give the mean scores and standard deviations for Mathematics, English and Science GCSE performance for GFI intervention and control students. For all three indices, intervention students' mean scores were actually very slightly *lower* than control students' scores. These results suggest that participation in the GFI intervention had no impact on academic performance.

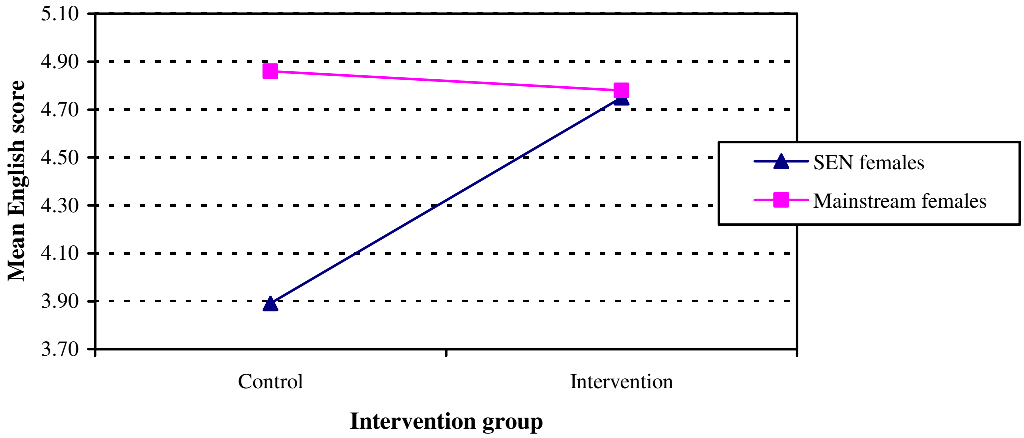
Table 4.5 Mean and standard deviation scores for GCSE Mathematics, English and Science: Control and intervention groups (standard deviations in parentheses, full sample N = 480)

GCSE variable	Control		Intervention	
	Mean (SD)	N	Mean (SD)	N
GCSE Mathematics	4.30 (1.50)	270	4.03 (1.68)	202
GCSE English	4.67 (1.40)	270	4.33 (1.49)	188
GCSE Science	4.37 (1.57)	273	4.14 (1.60)	158

[38] The educational/occupational aspirations analyses repeated without the three KS3 variables as covariates demonstrated exactly the same pattern of results as that discussed here. The analyses repeated removing all covariates and all independent variables apart from time of test and condition from the model, revealed no significant main effects of time or significant interaction effects for either assessment period, when analysing the full sample, or males and females separately.

The results of the ANOVA analyses for GCSE Mathematics, English and Science are shown in Table C.3.12 (Appendix C.3) (whole group and by gender). Overall, there was no statistical evidence that participation in the intervention resulted in improved GCSE performance for mainstream students. There was one positive effect for the SEN group: SEN females in the intervention group had nearly a one point higher GCSE English score than did SEN females in the control group (4.8 vs. 3.9) (Figure 4.10). In contrast, mainstream females in both groups had similar GCSE scores to the SEN female intervention group. This result must be taken with caution, however, given the small SEN sample size and the lack of significant main condition effects for these analyses.

Figure 4.10 GCSE English mean scores for female SEN and mainstream students



There was evidence of demographic and socio-economic factors affecting performance, even after controlling for prior academic ability. Free school meals eligibility was associated with GCSE Mathematics and English, but not Science. ACORN score was associated with GCSE English, but not Mathematics and Science. Special educational needs was only associated with GCSE Mathematics performance. KS3 Mathematics performance impacted on subsequent GCSE Mathematics and Science performance, but not on English; KS3 English performance impacted on subsequent GCSE Mathematics and English performance; and KS3 Science performance impacted on subsequent performance in all three GCSE disciplines. There was only a main effect of gender for English[39].

[39] The three GCSE models were tested again controlling for only one KS3 performance variable (that in the same subject area as the dependent variable). The models were also tested without controlling for academic performance. As might be expected, these analyses gave a similar pattern of findings for the demographic and socio-economic factors. However, there was again no evidence of statistically reliable differences in academic performance between intervention and control groups.

4.3.5 Testing for types of programme implementation

The analyses above test the hypothesis that the GFI intervention will affect self-perception and/or motivation, aspirations, and academic performance, regardless of the GFI mode of implementation. It may be, however, that one of the modes of implementation is more effective than the others, and therefore differential effects might be hidden with the different implementation groups. To explore this, the analyses were repeated dividing the intervention group into three separate implementation groups as detailed earlier ('intensive with revisits', 'intensive with no revisits' and 'dispersed with some revisits'). Therefore, rather than comparing one intervention group with the control group, the comparison was between three separate implementation groups and the control group.

Overall, the pattern of significant results was consistent with those reported above, for all the self-perception measures, and for the motivation, aspiration and academic performance outcomes. There were some differential effects in relation to type of implementation. However, these varied considerably by self-perception/outcome variable. The significant effects were variably associated with one or another of the implementation groups, and in some cases two of the implementation groups within the same analyses, but no one implementation type evidenced a consistent effect. These results indicate, therefore, that no one type of implementation is the most effective overall. However, they could also mean that the schools within each of the implementation groups are not actually delivering a similar type of programme.

In order to examine this, a student 'GFI process score' was utilised to compare the effectiveness of the different implementation groups/schools within the intervention group. This score was derived from the intervention process questions delivered to students at follow-up (see Appendix C.1 for the follow-up process questions and Appendix C.4 for an explanation of how the process score was derived). One might expect that higher the process score (i.e. the more students enjoyed the GFI programme and the more they engaged with the strategies taught), the more effective would be the mode of programme implementation. Implementation schools with the most effective implementation would therefore be expected to have similar process scores. A one-way ANOVA was conducted to test whether the GFI process score differed significantly between the intervention schools. The analysis using the three previously identified implementation groups indicated that there were two subgroups within the intervention group, not three, and that the 'dispersed with some revisits' group overlapped with both of the other groups ($F(2, 167) = 7.86$, $p = .001$; post hoc analyses used Tukey's HSD). A one-way ANOVA comparing the differences in process scores for all five intervention schools indicated that Schools A1 and B1 should be grouped with School E1, and Schools C1 and D1 should be grouped together ($F(4, 165) = 5.71$, $p < .001$). In effect this meant that the two schools in the 'dispersed with some revisits' group were split between the other two groups. The two new groups were called 'high delivery' (Schools A1, B1, and E1) and 'low delivery' (Schools D1 and E1) (the terms 'high' and 'low' represent the overall number of hours of programme delivery and the extent of revisits).

The main analyses were repeated again comparing the 'high delivery' and 'low delivery' implementation groups with the control group. The pattern of significant results was once again consistent with those reported in the sections above. The negative effects previously reported for SEN males were more evident for the 'high delivery' implementation group. It would appear that for this group of students, the more exposure they had to the programme the less they benefited from it. The significant effects previously reported for SEN females were not evident when separating by high/low delivery implementation groups, which indicated that the effect would remain whatever type of exposure to the programme these students experienced. The one exception was for GCSE English; the positive effect on English shown for SEN females was more evident for the 'high delivery' group. These analyses also revealed a *negative* effect on GCSE Mathematics for SEN females in the 'low delivery' group, with these students showing a 2 point lower mathematics score than the controls and the 'high delivery' group.

4.3.6 Experience of *Go For It!* and reported use of strategies

The analyses in this section were based on GFI students' responses to the process questions administered at the end of post-test and follow-up sessions (see Appendix C.1). Table 4.6 shows the proportions of students who enjoyed the course and engaged with the strategies it taught. Consistent with Johnson (2000) students were positive about GFI. At post-test, 81% of students reported that they enjoyed GFI training, and 80% reported that they felt they had learnt something useful. These proportions were slightly reduced at follow-up, but not to any great extent. At post-test, 63% of students thought that GFI would help them make positive changes in their school or at home. This reduced to 51% at follow-up, however.

GFI is only likely to benefit students if they put into practice what the course teaches. Students were asked, at post-test, to report the extent to which they intended to use specific strategies taught in the course, and then at follow-up asked whether or not they had actually engaged in these activities. As can be seen from Table 4.6, intended use of strategies taught during the intervention, measured immediately after the intervention had finished, varied considerably with type of strategy. A relatively high number of students said that they planned to set goals, visualise their goals, focus on solutions, talk positively to themselves, and listen to their own self-talk. Using positive self-talk was the strategy reported as being used most often (67%). Far fewer intended regularly reading or writing affirmations, however. As might be predicted, action did not match intention, with reported use at follow-up being consistently and substantially less for all strategies. Reading and writing affirmations, in particular, were reported as being used by less than 10% of the sample. Positive self-talk was still the most used strategy (43%).

Table 4.6 Students' perceptions of the programme and reported use of programme strategies

Intervention process question (numbers are consistent with those presented on the process questionnaire)	**Post-test**		**Follow-up**	
	Yes	**No**	**Yes**	**No**
1. Did you enjoy the *Go For It!* sessions?	80.6%	9.1%	77.8%	11.9%
2. Do you think you learnt anything useful in the *Go For It!* sessions?	80.2%	8.0%	70.1%	18.7%
3. Do you think that *Go For It!* will help you (has helped you) make any positive changes in your school and home life?	63.4%	15.1%	50.5%	29.0%
6. Reported engagement with strategies:				
Set goals for yourself	61.1%	13.0%	30.2%	35.2%
Listen to your own self-talk	60.0%	13.5%	33.1%	36.6%
Talk positively to yourself	67.4%	8.7%	43.4%	28.0%
Write affirmations	32.6%	39.7%	9.1%	72.0%
Read affirmations	35.1%	38.4%	9.7%	72.6%
Visualise your goals	60.3%	13.6%	34.5%	31.1%
Avoid putting yourself down	54.3%	19.6%	34.1%	33.0%
Avoid putting others down	56.8%	18.9%	32.8%	36.7%
Focus on solutions	66.5%	9.7%	35.6%	28.2%

Note: For Questions 1 to 3: 'Yes' includes scores 5-7 ('Yes, a bit' to 'Yes, very much'); 'No' includes scores 1-3 ('No, not at all' to 'Not much'). For the reported engagement items: 'Yes' includes scores 4-5 ('Often' and 'Very often'); 'No' includes scores 1-2 ('Not at all' and 'Hardly ever'). For these questions, therefore, the middle response was excluded from the Yes/No divisions. N = 175 to 187.

Students reported use of strategies by 'high delivery' and 'low delivery' groups were examined to determine if engagement in strategy use varied according to the amount of exposure to the programme (see Table 4.7). The general pattern seemed to be that where programme delivery included more contact hours and more revisits, there was a greater tendency for students to make use of the strategies they had been taught. This was especially evident at follow-up.

Table 4.7 Students' reported use of strategies by 'high delivery' and 'low delivery' groups

Strategy	High delivery		Low delivery	
	Post-test	Follow-up	Post-test	Follow-up
Set goals for yourself	65.3%	33.6%	56.3%	24.6%
Listen to your own self-talk	61.2%	37.1%	58.6%	27.1%
Talk positively to yourself	67.3%	45.7%	67.4%	40.0%
Write affirmations	39.8%	10.4%	24.4%	7.2%
Read affirmations	41.4%	12.3%	27.9%	5.8%
Visualise your goals	60.2%	38.9%	60.5%	27.5%
Avoid putting yourself down	59.2%	34.9%	48.8%	32.9%
Avoid putting others down	55.6%	33.6%	58.1%	31.4%
Focus on solutions	67.3%	36.4%	65.5%	34.3%

Note: Proportions are for the number of students who responded 'Often' or 'Very often'. High delivery: N = 98 to 110. Low delivery: N = 69 to 87. The proportions were also examined separately for SEN and mainstream students and the pattern of findings was the same as that reported here.

The relationship between students' reported use of GFI strategies at follow-up and (a) the change in their self perception and motivation scores from baseline to follow-up, (b) the change in their aspirations between baseline and follow-up, and (c) their GCSE results, was explored. Relationships were examined separately for 'high delivery' and 'low delivery' groups and used partial correlations (i.e. which controlled for free school meals, ACORN score and Mathematics, English and Science KS3 scores). If, by using GFI strategies, students affect a change in their self-perception then we would expect to see a positive correlation between reported strategy use and increases in self-perception, motivation and aspirations. We would also expect to see more positive correlations in the 'high delivery' group.

There was some evidence of a relationship between writing affirmations regularly and change in Communication/Performing Arts Self-Efficacy and Mathematics/Science Competency, between visualising goals and change in Communication/Performing Arts and Self-Assertive Efficacy (self-efficacy structure), and between focusing on solutions and change in Self-Assertive Efficacy (competency structure). These were for the 'low delivery' group. There was also a relationship between change in Preference for Challenge Motivation and visualising goals (for the 'high delivery' group). Correlations ranged from .24 to .30. There was a slightly stronger relationship between change in Academic Competency and writing affirmations regularly/visualising goals (correlations of .39 and .32 respectively). These were also for the 'low delivery' group. These strategies therefore explained 6% and 15% of the variance in some aspects of self-perception. These findings indicate that strategy use is important for GFI to take effect on some types of self-perception. All other correlations were very low, mostly under .1, and there were no other discernable differences between the groups[40].

Table 4.8 shows the relationships between strategy use at follow-up and GCSE performance. Using positive self-talk, and avoiding putting yourself and others down, are positively related to GCSE Mathematics performance for the 'low delivery' group (explaining between 9% and 14% of the variance). There were no statistically significant relationships between strategy use and GCSE Science performance. For the 'high delivery' group, setting goals, listening to your own self-talk and actively using positive self-talk were significantly and positively related to GCSE English (these explained 10%, 16% and 17% of the variance respectively). There was, however, a significant negative relationship between writing affirmations regularly and English for this group of students (12% variance), which indicated that these type of affirmations are not important for aiding performance in English.

Table 4.8 Partial correlations between students' reported use of strategies at follow-up and GCSE performance by 'high delivery' and 'low delivery' groups

Strategy	GCSE Maths		GCSE English		GCSE Science	
	High delivery	Low delivery	High delivery	Low delivery	High delivery	Low delivery
Set goals for yourself	.13	.22	.42**	-.06	.01	.15
Listen to your own self-talk	.24	.07	.32*	-.20	.27	.03
Talk positively to yourself	.12	.37*	.40**	-.13	-.15	.16
Write affirmations	-.25	.15	-.34*	-.19	-.03	.12
Read affirmations	-.09	.22	-.04	-.14	.19	.20
Visualise your goals	.05	.19	-.21	-.27	-.07	-.00
Avoid putting yourself down	.25	.36*	.11	-.12	.12	.10
Avoid putting others down	-.11	.30*	-.08	-.08	.04	.27
Focus on solutions	.03	.14	.01	-.22	.06	.02

4.3.7 Summary of findings

Table 4.9 gives an overview of the significant effects of the intervention, comparing the intervention and control groups, and showing whether the effects differed by 'high delivery' and 'low delivery' implementation group. Overall, there were only significant positive effects for two self-perception variables and these were only for mainstream boys, not the whole group. There was also a significant positive effect for GCSE English but this was only for a small subgroup of SEN females. The remainder of the significant effects were negative and associated with SEN students. Furthermore, there was no evidence of

[40] Analyses repeated using bivariate correlations (not controlling for free schools meals, ACORN and past academic performance) revealed a similar pattern of findings.

any change in motivation. These results are disappointing for an intervention that purports to positively enhance many dimensions of self-perception, as well as academic performance, aspirations and motivation. How these findings relate to the research questions is discussed below.

Table 4.9 Overview of significant effects (comparing intervention and control groups)

Measure / Construct	Effect	Effect size[a]	Group or subgroup	Assessment period[b]	Effect by high/low delivery group?
Self-Efficacy					
Enlisting Social Resources	-ve	.038 (.033)	female SEN	post-test	no difference
Self-Regulatory Efficacy	-ve	.033 (.034)	female SEN	follow-up	no difference
Social Self-Efficacy	-ve	.044 (--)	male SEN	post-test	high
Self-Concept					
Physical Appearance	-ve	-- (.051)	male SEN	follow-up	high
Romantic Appeal	+ve	.066 (--)	male mainstream	follow-up	no difference
	-ve		male SEN		high
Close Friendship	+ve	-- (.039)	male mainstream	follow-up	no difference
	-ve		male SEN		high
Domain-specific (first-order) self-competence					
Self-Regulatory Efficacy for Good Conduct	-ve	.032 (.041)	female SEN	follow-up	no difference
Job Self-Concept	-ve	.052 (.048)	male SEN	post-test	high
Self-Assertive Efficacy	-ve	.057 (--)	male SEN	post-test	high
Good Conduct Competency	-ve	.054 (--)	male SEN	follow-up	high
Second-order self-competence					
Behavioural Conduct Competency	-ve	.052 (--)	male SEN	follow-up	high
Sports & Physical Appearance Competency	-ve	-- (.041)	male SEN	follow-up	high
Social Competency	-ve	.074 (.078)	male SEN	both	high
Self-esteem	-ve	.042 (--)	male SEN	follow-up	high
Aspirations					
Educational aspirations	-ve	.046 (.054)	male SEN	post-test	high
Occupational aspirations	-ve	.049 (.038)	male SEN	follow-up	high
Academic performance					
GCSE Mathematics[c]	-ve	-- (--)	female SEN	n/a	low
GCSE English	+ve	- (.019)	female SEN	n/a	high

[a]First value refers to time-by-condition interaction; value in parentheses refers to time-by-condition-by-SEN interaction, except for academic performance where the value refers to main effect of condition and time-by-condition interaction respectively. '--' indicates a non-significant effect.
[b]'post-test' refers to baseline/post-test analyses; 'follow-up' refers to baseline/follow-up analyses.
[c]This effect was only apparent for the high/low delivery group analyses.

4.4 Discussion

4.4.1 Does the *Go For It!* intervention lead to improved self-perceptions?

Overall, these findings are not consistent with the suggestion that the GFI intervention, which is based on facilitating enhancements in self-perceptions by changing students self-talk, benefits the self-perceptions of students in the mainstream schooling population. There was some evidence of a slight, but statistically significant increase in Romantic Appeal Self-Concept and Close Friendship Self-Concept between post-test and follow-up for mainstream males, but no other positive effects. These significant effects were not apparent in the high/low delivery analysis, which indicates that all GFI delivery formats facilitate enhancement of these types of self-concept perceptions. The effect sizes were not large, however (.039 and .066 respectively), and might not be practically significant.

The GFI intervention is therefore useful for facilitating improvements in some aspects of interpersonal relationships for mainstream males. These findings are consistent with previous research that suggests it is possible to enhance self-perceptions (e.g. Haney & Durlak, 1998; Hattie, 1992; O'Mara et al., 2006). Moreover, they do not support previous research that suggests that self-concept does not easily lend itself to manipulation because of how it is formed (e.g. Craven et al., 1991; Marsh & Yeung, 1998). It is unclear why there might be positive effects on Romantic Appeal and Close Friendship self-concepts, but not on any of the other self-perceptions, however. It might be that strategy use is not important for the enhancement of these two representations of the self (there was no evidence of a relationship between these and any of the strategies used in GFI). Or there might be a more direct effect: perhaps the way GFI is implemented helps male students in the mainstream population feel better about their relationships with other people. Talking to girls more, for example, might impact on their perceptions of competence in romantic contexts, or more opportunity for social contact in school in a relaxed environment might help with perceptions of ability to make close friends.

It is also unclear why there are negative effects on some self-perception variables for SEN students, or why these effects are associated with the 'high delivery' programme implementation for male students. These findings suggests that the more exposure male SEN students have to GFI (more contact hours and more revisits), the more negative is its impact – the opposite of what would be expected. Any findings associated with SEN students must be taken with caution, however, as there were only a very small number in the sample. As shown in Table 4.3, there were only 44 special educational needs students in the intervention group (23 female and 21 male). As there was some listwise deletion of missing data in the analyses, final numbers would have been even smaller. Furthermore, the effect sizes were only small to medium (ranging from .033 to .078 across the significant univariate results shown in Table 4.9). Taken together, these findings indicate that using the GFI intervention in its current form is not worthwhile in an educational climate that values self-perception enhancement.

4.4.2 Which self-perception is more susceptible to intervention?

Taking these results at face value, it would be concluded that self-concept is the most susceptible of the different self-perceptions to intervention. However, given the veritable lack of positive effects for the other self-perception variables, it is not possible to conclusively determine that this is the case. These results do not suggest that self-efficacy, self-esteem and self-competence perceptions cannot be manipulated. It just means that the intervention used here was not successful as a vehicle for doing so.

These findings contrast research examining the *Bright Ideas: Skills for Positive Thinking* programme discussed earlier (e.g. Brandon, Cunningham, & Frydenberg, 1999; Craig, 2004; Cunningham, 2002a, 2002b; Cunningham, Brandon, & Frydenberg, 1999, 2002; Cunningham & Frydenberg, 2000). These authors found positive effects on coping self-efficacy, which indicated that GFI, with its similarity to *Bright Ideas*, might impact on at least some aspects of self-efficacy. However, the null findings demonstrated here suggest either that GFI is not effective in raising self-efficacy, or that it may have had effects on other aspects of self-efficacy that were not measured. The effects of *Bright Ideas* on self-concept or self-esteem, or similar outcome measures to those used here, have not been examined. Therefore, it is not possible to make a direct comparison in these areas.

Bright Ideas was more motivated by adherence to theory than GFI, and this may be part of the reason it was successful for enhancing specific aspects of self-efficacy when GFI was not. Whilst both *Bright Ideas* and GFI were modelled on Ellis' Rational Emotive Therapy techniques (Ellis, 1962, 1975), which aim to develop control over thoughts, feelings and behaviours, *Bright Ideas* was also directly modelled on the cognitive attribution component of the *Penn Prevention Program*: a school-based programme aimed at preventing depression and pessimistic attributions in adolescents (Jaycox et al., 1994; Seligman, 1995; Shatte et al., 1999). This programme was developed by paying close attention to theoretical considerations and has been demonstrated to be very effective in randomised controlled trials.

Furthermore, rather than being implemented by teachers trained in facilitation of the programme, as is the case with GFI, *Bright Ideas* was implemented by school psychologists who worked in conjunction with the school. The Australian Government specifically supported the development of programmes such as *Bright Ideas* in Australian schools and released funding to retrain a number of school psychologists with specific responsibility to deliver and monitor the programmes. It may be that their greater familiarity with the techniques and principles of *Bright Ideas*, and the psychological principles underlying its development, was partly responsible for its greater effectiveness in relation to GFI.

4.4.3 Does the *Go For It!* intervention lead to positive changes in academic outcomes?

The results are clearly not consistent with the intervention having a direct effect on motivation (no statistically significant effects were observed), and any effects associated with aspirations were negative and associated only with the small group of SEN males. There was evidence of a slight positive effect for SEN females for English performance. This was more evident for the 'high delivery' group. Therefore, for female SEN students, more exposure to the programme appeared to have a positive impact on GCSE English performance. The effect size was small, however (partial η^2 = .019). Given that an effect size of around 0.5 to 0.7 (Cohen's d; equivalent to a partial η^2 of between .059 and .111) represents an increase of one GCSE grade (Coe, 2000, 2002), an effect size of .019 is unlikely to be practically relevant. However, these results indicate that English performance increases by nearly one point on a 9-point scale. This is close to a rise of one GCSE grade and might be enough to increase performance from a 'D' grade to a 'C' grade, for example, which is the requirement for a Level 2 GCSE pass. The analyses by implementation group also demonstrated a negative effect of intervention on GCSE Mathematics for SEN females in the 'weak delivery' group. These results provide some evidence that for females with special educational needs, participating in a 'high delivery' format of the GFI programme might be beneficial for some aspects of academic performance, but participating in a 'low delivery' format would not be.

The pattern of findings demonstrated here makes it impossible to determine whether self-perceptions have a causal influence over academic functioning. A causal influence of self-perceptions could be argued if changes in self-perception are accompanied by changes in academic functioning, especially in the case of GCSE performance, given that this research controls for prior academic ability. However, these types of relationships are non-existent in this study. The positive effects on Romantic Appeal and Close Friendship for mainstream boys were not accompanied by any positive changes in academic functioning for this group of students. Furthermore, the positive effect on GCSE English for SEN females was not accompanied by any positive change in self-perception for these students.

The regression analyses presented in Chapter 3 indicated that the strongest predictive relationships were between Self-Efficacy for Self-Regulated Learning and two types of motivation (Independent Mastery and Preference for Challenge). This type of self-efficacy evidenced a strong independent contribution to the model for these motivation variables. It was also an important predictor for GCSE Science and GCSE English, although the relationships were much weaker. Taking as an example the First-Order Self-Competency structure, the overall percentages of additional variance explained in the model were 17.2% and 25.9% respectively for the two motivation variables, compared to 6.2% for Science, and 1.7% for English. We might expect, therefore, that the higher levels of additional variance explained might result in a significant, real-term improvement in motivation, but little or no improvement in English performance. However, given the lack of effects on all of these variables, it was not possible to examine this issue.

4.4.4 Reasons why there was limited evidence of significant positive effects

These results do not provide conclusive evidence that it is not possible to intervene to improve self-perceptions and the other outcomes under study – only that the intervention used in this study is unsuccessful as a mechanism for doing so. One possible explanation for the failure to find evidence for improvements in self-perception, etc. is that the high amount of missing data overall may have worked against the data yielding statistically robust effects even if GFI did, in fact, benefit the students. The intervention sample size was sufficiently large to give a good probability of finding quite small effects statistically significant, as is evidenced, for example, by the finding of a slight, but statistically significant effect of gender and special educational needs on GCSE English performance. Even with the smaller number of students included in this sample therefore, the indication was that there was sufficient power to find small effects statistically significant. It is conceivable, however, that the missing data within the dataset may in itself have acted against finding effects. The students who were not sampled in this analysis might have benefited from the intervention, whereas those who were included did not. This is plausible given the significant differences on all the key variables between the full sample and the intervention sample.

The design of the study was necessarily prospective, with non-random allocation to control and intervention conditions, and this might have affected the results. However, control and intervention schools were reasonably well matched in terms of performance and student socio-economic status, and GFI was implemented across five different schools at different times and with varying patterns of delivery. The sample size was such that effects on self-perception and motivation in just one of these schools, between baseline and either post-test or follow-up, would have resulted in statistically significant test-by-condition interactions, but these were not consistently found, especially for mainstream students. Non-random allocation does not, therefore, seem a very plausible explanation for the failure to find significant intervention effects.

If missing data and sampling are not to blame for the failure to find consistent significant effects, then this suggests that GFI, as implemented in the five schools that made up this intervention sample, is not effective to develop self-perception, intrinsic motivation, aspirations and academic performance for this sample of Year 10 students. One possible explanation for this may simply be that students do not adopt the strategies that the GFI intervention teaches. Just attending GFI is clearly unlikely to have anything but very transitory effects on how students perceive themselves. Change will only occur if students become self-regulated users of the strategies that GFI teaches. Yet the numbers of students reporting at follow-up that they had engaged in these activities on a regular basis were few. Furthermore, it is possible that the numbers of intervention students who reported talking positively to themselves, for example, were not substantially higher than the numbers engaging in this activity in control schools. Less than 10% of students reported having regularly written or read affirmations – two self-talk enhancement activities that were very specific to GFI. The most straightforward explanation for failure to find positive effects of GFI might therefore simply be that students did not engage in the strategies that it teaches.

The relationship between strategy use and the various self-perception, motivation, aspiration and performance variables was explored. There was some evidence of certain strategies helping to affect change in a number of the self-perception variables. Furthermore, there was also evidence of a significant relationship between various types of strategy use and GCSE performance in English and Mathematics, with positive self-talk and goal-setting demonstrating the strongest relationships. The finding of a relationship between goal-setting and academic performance supports previous research that suggests setting goals enhances performance (e.g. Tanaka & Yamauchi, 2001; Zimmerman, Bandura, & Martinez-Ponz, 1992). Effects were variably associated with the 'high delivery' and 'low delivery' groups. This demonstrates the importance of using strategies in schools where the programme delivery has less contact hours and less revisits (i.e. 'low delivery' schools). The evidence is, therefore, that strategy use aids in the ability of the GFI programme to facilitate positive effects on some aspects of academic and psychological functioning and not using these strategies is likely to impact on its intended benefits.

Hence, however beneficial positive self-talk might be in principle, participants might not have developed the necessary self-regulation to use it independently and on a regular basis. The results presented here suggest that although students had reported understanding and appreciating the content of the programme, it had failed to bring about the kind of behavioural change that would be necessary to affect their self-perceptions. This perhaps requires a degree of behaviour modification that cannot simply be achieved through a combination of exhortation and practice exercises delivered over a relatively short period of time. There is also likely to be a relationship between existing self-belief and tendency to adopt strategies by which it could be improved. Adolescents who do not believe that they are able to regulate their own behaviour are less likely to strategically engage in behaviours that could modify this belief. Both studies cited previously as providing evidence for the benefits of self-praise (Barrett et al., 1999; Craven et al., 1991) involved prolonged and fairly intensive group work or classroom based interventions in which the target behaviours were repeatedly practiced.

Lack of student compliance is therefore the most obvious explanation for GFI failing to positively affect self-perceptions. However, even with better uptake of the strategies taught in the course there are *a priori* reasons why interventions of this sort may have limited success. Bandura (1986, 1997) identifies mastery experiences as the main mechanism for developing self-efficacy. Self-efficacy develops as a result of repeatedly observing success at a particular kind of task – principally the individuals own success but also observing success in others who are perceived as having similar competence ('if they did it, then so can I') may also result in some gains. Multiple successes on specific tasks can then result in a more generalised belief in ability to perform in other tasks in a similar domain. Bandura recognises the possibility of verbal persuasion and positive feedback from others (one focus of GFI) helping to develop self-efficacy, but this mechanism is very much secondary to mastery experience. He also cautions against raising unrealistic competence beliefs, suggesting that this is likely to result in a decrease in self-efficacy when performance falls short of expectations. It may be that self-talk based interventions applied indiscriminately across whole-year cohorts are too blunt an instrument to achieve any appreciable gains.

The failure to find benefits for GFI may therefore simply be because GFI in its current form is unlikely to deliver its intended effect. The intervention is based on the psychological principle that having high self-concept/self-esteem and/or self-efficacy typically has, in itself, and independently of ability, a direct effect on performance. There is reasonable evidence for this. However, it is less clear that an intervention that is directly targeted at developing students' self-perceptions, through strategies that are independent of their academic work, will result in increases in self-perceptions in specific domains of functioning. Self-efficacy, in particular, tends to develop as a result of students being aware of their own good performance in a particular area. Students will develop high self-efficacy for mathematics, for example, if they believe that they have in the past performed well in mathematics. Existing research suggests that this effect is quite specific. Thus high self-efficacy for calculating angles, for example, is likely to result from students perceiving that they have been successful in previous geometry tasks. *Go For It!* attempts to effect change at a more general level, and instruction during the intervention is deliberately separated from the students' day-to-day performance in the classroom. It may be, therefore, that traditional methods of developing self-efficacy – mastery experiences or praising students when they get something right – may be more effective.

It must be noted, however, that self-perception (as well as motivation and aspiration scores) were in the main, relatively high at the start of the study. Given such a high baseline, it remains to be seen whether there is actually scope for raising self-perceptions. It has also been argued that self-concept and self-esteem specifically are relatively fixed and not very subject to manipulation, especially in students of older age-groups (Craven et al. 1991; Marsh & Yeung, 1998; Shavelson & Bolus, 1982). The high baseline self-perceptions may be a consequence of the Local Education Authority's previous efforts to enhance self-perceptions. As discussed in Chapter 1, the last 20 years or so have seen a drive to improve self-perceptions, especially self-esteem, in primary school (which is the age that self-perceptions are seen as being more susceptible to intervention). Therefore, by the time students reach secondary school their self-perceptions may have achieved a maximum limit, making it difficult to affect further change. This might be particularly relevant for the schools in the city where this research was conducted. Fifteen years ago there were a large number of primary and secondary schools in special measures, with poor

OFSTED results. However, a programme of focused support and intervention by education advisors has led to major improvements and by the time this data was collected many schools had been removed from the failure list, with more following in subsequent years.

It may also be that GFI did result in positive benefits, but that these were matched by similar improvements in control schools, achieved by different means. Given the focus on raising self-perceptions in school, it is likely that all of the schools in the sample, both the GFI group and matched controls, saw developing student self-perceptions and motivation as worthwhile goals, and that they were engaged in some sort of activity in order to achieve this. In control schools this may have been in the form of other interventions (although these would need to have occurred between baseline and post-testing to match the measured effects of GFI), or through more implicit strategies used on a day-to-day basis in the classroom. The finding of a general, though very slight, increase for nearly all self-perception and motivation variables between baseline and follow-up is consistent with this hypothesis.

These findings represent evidence against the efficacy of motivational training programmes that aim to benefit adolescents' self-perceptions by encouraging the use of positive self-talk. This is not altogether inconsistent with previous findings. Martin (2008) did not find benefits for either self-efficacy or mastery orientation from a multidimensional motivational training intervention (but did find positive effects on three measures not directly related to self-belief). Proudfoot, Gorvett, Noble, & Reeves (2001) evaluated a Pacific Institute sister programme with content very similar to that of the present intervention but with a slightly older population, and again found no effects on either self-efficacy or self-esteem, or on a relevant performance measure. Furthermore, although O'Mara et al. (2006) found an average medium effect of interventions that had motivational training as a sole or substantial component, this was based on just two published studies out of a total of 200 surveyed by their meta-analysis.

Whatever the reason for the apparent failure of GFI to affect either self-perceptions and/or motivation, aspirations and performance, it remains possible that GFI does, in fact, have some positive effects, but these are in areas not measured in this study. *Go For It!* is a broad and eclectic intervention and the present study necessarily only focussed on the psychological variables central to its putative effect. It may be, for example, that students who have participated in GFI develop in areas such as ability to set goals or to communicate more effectively with teachers and peers, or in their attitudes to schooling. It may also be that GFI affects different psychological variables. Approaches to learning (e.g. Biggs, 1997) and emotional intelligence (e.g. Charbonneau & Nicol, 2002) are possible candidates, although they do not appear to be targeted as directly by GFI as the psychological variables measured here. Positive effects in these areas might be reason in themselves to implement GFI across whole year groups, even if they do not translate into improved academic performance.

5 DISCUSSION AND CONCLUSIONS

5.1 Addressing the Research Questions

This research was designed to answer a number of questions around the nature of self-perceptions and how they relate to specific aspects of academic functioning. The main research questions to be answered were:

- To what extent is the self important in the development of academic performance, intrinsic motivation and aspirations?
- Which aspect of the self (self-esteem, self-concept or self-efficacy) is the most important in the development of these academic outcomes?
- It is possible to intervene to enhance self-esteem, self-concept and self-efficacy?
- Do self-perceptions have a causal influence over academic performance, intrinsic motivation and aspirations?
- Is the factor structure of self-concept and self-efficacy multidimensional and hierarchical?
- Are self-efficacy and self-concept constructs distinct?

The answers to these questions are brought together under the following three headings: How is the self represented? How does the self relate to academic functioning? Does intervention have any affect on how the self is represented?

5.1.1 How is the self represented?

This research shows that for students of this age-group – middle adolescents – the overall structure of self-efficacy and self-concept is both multidimensional and hierarchical. What is clear is that students of this age categorise these types of inferences about the self such that information representing the same or similar aspects within each construct resides within the same category, or the same *domain*, in the self-schema. These domains are arranged in a hierarchical structure such that the more general the information about the self, the closer it is to the apex of the hierarchy. The more similar the domain-specific representations, the more likely they are to relate to the same underlying aspect of the self.

In this study, self-concept is shown as having a two-level hierarchy with seven domain-specific self-concepts that represent three underlying aspects of the self: physical, scholastic/behavioural, and social. Physical Self-Concept is represented by two individual dimensions (athletic and physical appearance). Scholastic/Behavioural Self-Concept is also represented by two dimensions (scholastic and behavioural), and Social Self-Concept is represented by three dimensions (close friendship, social acceptance, and romantic appeal). The factor analyses also demonstrated an additional domain-specific factor that represents ability to undertake job-related activities. At the domain-specific level, therefore, middle adolescent students have eight separate and meaningful representations of self-concept. These factors are broadly consistent with the eight factors presented by Harter (1988), although there are four fewer items in the overall structure. The job domain does not appear to be part of the underlying representation of the self, however, which indicates that these students are only just starting to get some idea of what it means to ‘work’.

Self-efficacy is also shown as having a two-level hierarchy with seven domain-specific self-efficacies. In contrast to self-concept, these represent two underlying aspects of the self: academic/self-management, and social. The first of these is represented by four individual dimensions (self-regulated learning, mathematics/science, self-regulation for good conduct, and social self-regulation). The second of these is represented by three dimensions (self-assertiveness, sports, and communication/performing arts). Hence, at the domain-specific level, middle adolescent students have seven separate and meaningful representations of self-efficacy. This interpretation of the MSPSE is not consistent with that presented by Bandura (1990) (having two less factors and 11 less items), although two factors are very similar.

The psychological literature proposes two different and contrasting models concerning the structure of self-concept: the correlated-factor model and the hierarchical model. The former of these models suggests that the various dimensions of self-concept are conceptualised such that global judgements are on the same level as more specific judgements, rather than being something that arises out of them, as is the case with a hierarchical structure. The findings presented here are consistent with previous research that supports both the multidimensional and hierarchical nature of self-concept, and that indicates that there are a number of levels in the self-concept structure (e.g. Lau et al., 1999; Marsh & Shavelson, 1985; Shavelson, et al., 1976; Vispoel, 1995). Such research has been limited for examining self-concept hierarchy using versions of the SDQ or models relating to it, however, which are based on a hierarchical model. This research, which has used a different questionnaire based on the correlated-factor model, supports these earlier findings. There is no support, therefore, for the correlated-factor model of self-concept. Harter (1990a, 1990b) sees the structure of self-concept as being represented by the correlated factor model and developed the MSPSE within this structure. She argues that individual self-concept judgements in different domains can occur without reference to higher-order, more general judgements, or without reference to overall self-esteem. She also argues that a hierarchical structure does not represent the psychological nature of the self as it is phenomenologically experienced. These results do not support her argument, however, and show that for this age-group, domain-specific judgements of the self do arise from more general and subjective experiences in similar contexts.

Previous research examining the structure of self-efficacy has been limited but does indicate that it has a 'loosely hierarchical' structure (Bong & Skaalvik, 2003). The findings presented here take psychological research a step closer to understanding the structure of self-efficacy and show that it has a definite hierarchical content with at least two levels. Hence, an individual's representation of their self-efficacy exists at a higher-order level in much the same way as their self-concept representation has been show to do. The finding of a two-factor second-order solution is in contrast to previous research using the MSPSE that suggests self-efficacy has three underlying dimensions, however (Choi et al., 2001; Miller et al., 1999). These authors showed separation between academic and self-regulatory aspects of the self. Although, as here, they used all of the subscales of the MSPSE, both studies used different age-groups. This might be one reason why they achieved a slightly different structure. There is an interesting point to note: one might expect that all academic self-perceptions would combine together to create an underlying academic representation of the self. However, communication/performing arts activities formed part of the underlying social self. This indicates that such disciplines are not viewed as 'true' academic activities, but have more relevance in a social environment. In contrast, mathematics and science-related academic self-efficacies formed part of the underlying representation of what it means to 'behave'. This is consistent with the self-concept findings; in both sets of analyses academic and behavioural factors loaded with 'true' academic competencies at the second-order level. Hence, such academic and behavioural representations of the self both seem to be associated with an educational, rather than a social, environment.

Taken together, these results show that at the domain-specific level, middle adolescent students have seven separate and meaningful representations of self-efficacy, and eight separate and meaningful representations of self-concept. However, many of these domains seem to provide the same or similar representations of the self. For example, at the domain-specific level, Athletic Self-Concept appears to be similar to Sports Self-Efficacy. Moreover, the second-order representations of the self are similar for both constructs. Hence, given that perceived competence is the primary component of both self-efficacy and self-concept (as it is conceptualised in this study), we might expect that they actually represent the same or similar aspects of personality. To some extent, this was what was found here; self-efficacy and the competency-related elements of self-concept were shown to be relatively distinct at the domain-specific level, with overlap between only a few components. In contrast, at the second-order level the overlap of self-efficacy and self-concept was considerable, with none of the demonstrated factors being distinct. Hence, for this age-group, the underlying representation of the self appears to be based on a common cognitive representation of perceived self-competence, rather than the more explicitly defined representations of self-efficacy or self-concept. At the domain-specific level this separates out into more distinct self-efficacy and self-concept components, although there is still some representation of a less distinct self.

This cognitive representation is shown here as having a two-level hierarchy with ten domain-specific self-competencies that represent four more general aspects of the self: academic, behavioural, sports/physical appearance, and social. Academic Competency is represented by three individual dimensions, two of which reflect self-efficacy (self-regulated learning and communication/performing arts) and one which reflects self-competence (mathematics/science). Behavioural Competency is represented by three dimensions, one which reflects self-competence (good conduct) and one which reflects self-efficacy (self-regulation for good conduct). Sports/Physical Appearance Competency is also represented by two dimensions, one self-concept (physical appearance) and one self-competence (athletics/sports). Social Competency is represented by three dimensions, two self-concept (friendship and job), and one self-efficacy (self-assertiveness). There was, therefore, overlap of self-efficacy and self-concept items in three domain-specific areas: mathematics/science, good conduct, and athletics/sports. The indication is that perceptions of ability to undertake any kind of sports activity represent the same aspect of the self, whether or not such activities have been defined differently (either conceptually or operationally). This also follows for aspects of the self related to good behaviour, and for those aspects related to ability to undertake mathematics and science subjects.

Academic factors were again split by mathematics/science and communication/performing arts disciplines, although in contrast to the distinct self-efficacy structure, both of these types of disciplines were part of the *same* underlying representation of what it means to be academically competent. Interestingly, the mathematics/science factor includes perceptions of the self as being intelligent and being good at working out answers. It appears, therefore, that such representations are more important in relation to these subjects than they are to more general academic competence. Also interesting is that competency perceptions of good conduct include perceptions of how well one can do in school. Hence, while a student's view of generally doing well in school is associated with how well they behave, their view of themselves as being intelligent and able to solve problems is associated with ability in certain subjects, namely mathematics and science. These subjects are particularly valued as evidence that one is doing well at school and form a major part of the core curriculum in UK education.

Evidence of a hierarchy to the self-competence representation of the self is not surprising given that this research demonstrates that distinct self-efficacy and self-concept constructs also have a hierarchical structure. The finding of a hierarchy to aggregate self-efficacy and self-concept components supports research reported by Pietsch et al. (2003) and Skaalvik and Rankin (1996b). The second-order factors shown in this aggregate analysis are broadly commensurate with those evidenced by the individual structures, as might also be expected, although there was one more factor than the self-concept structure and two more than the self-efficacy structure. The aggregate structure demonstrated a distinct academic second-order factor, in contrast to the individual structures. This greater differentiation might be due to there being more items in total in the analysis. This indicates that to achieve a true overall representation of the self we need to examine perceptions of the self in multiple contexts, not just look at a small number of narrow domains, as has been the case with much previous research (e.g. Ferla et al., 2009; Pietsch et al., 2003).

Taken together, these findings indicate that perceived competence provides the foundation for cognitive representations of the self, at least at the levels of measurement examined here, and for this age-group. At this level, therefore, there might be little benefit in using separate measures of self-efficacy and self-concept to examine how individuals perceive themselves as being able to perform in different contexts.

5.1.2 How does the self relate to academic functioning?

Overall, the findings indicate that both self-efficacy and self-concept would be useful for predicting academic functioning. There was also strong evidence that measures of self-competence are useful for doing so. These relationships continue even after taking ability/past academic performance, special educational needs, gender and socio-economic status into account. Self-esteem was a very weak predictor, however. Hence, self-efficacy and self-concept, but not self-esteem, appear to be important in the development of academic functioning.

Self-esteem evidenced a completely different pattern of relationships with the academic outcomes than did the other self-perceptions. The relationship between self-esteem and all the academic outcomes was very weak and generally self-esteem explained less than 0.8% of additional variance depending on outcome (after accounting for previous academic performance, etc.). The one exception to this was Independent Mastery Motivation, where self-esteem explained 1.6% additional variance. There was therefore no support for using self-esteem to predict academic outcomes such as those examined here, and no support for facilitating improvements in self-esteem in order to enhance academic functioning. These findings support previous research that suggests self-esteem is not practically relevant in the development of academic performance when past performance and other common background factors are accounted for (Ross & Broh, 2000; Rubin et al., 1976, 1977; Schmidt & Padilla, 2003). They also support research that suggests the self-esteem–aspirations relationship is weakened when socio-economic status is controlled for (Young, 1997). The implication is, therefore, that interventions designed to raise aspirations and enhance academic performance and intrinsic motivation through facilitating more positive self-esteem are unlikely to have any effect. Hence, self-esteem is unlikely to be important in the development of academic functioning.

There was a predictive relationship between aspects of self-efficacy and self-concept and all the GCSE performance indices. This remained even after the effects of prior academic performance and ability were accounted for. This supports previous research that indicates that both these self constructs are causally influential in the development of academic performance (e.g. Valentine et al., 2004). Generally, the findings here show that self-efficacy tends to be a better predictor of academic performance than does self-concept. This might be because self-efficacy (which has more cognitive elements than self-concept) demonstrates a more logical correspondence with academic performance (which relies on good cognitive ability). These findings support previous research that shows self-efficacy to be a better predictor of the two constructs (e.g. Mone et al., 1995; Pajares & Johnson, 1994; Valentine et al., 2004). The higher predictive utility of self-efficacy was evident across all three GCSE performance indices and this remained constant however self-efficacy and self-concept were measured. Unexpectedly, there was no evidence that self-efficacy or self-concept perceptions mediate the relationship between past performance and future performance, i.e. that self-perceptions influence future performance, but are themselves influenced by past performance. These findings do not, therefore, support research that suggests academic performance influences the development of self-perceptions (e.g. Guay et al., 2003). Nor do they support self-efficacy theory (Bandura, 1997), which proposes that self-efficacy and academic performance have a reciprocal relationship.

Both self-efficacy and self-concept were very strong predictors of Independent Mastery and Preference for Challenge motivations. These findings support previous research that shows a strong predictive relationship between self-efficacy/self-concept and motivation (e.g. Gottfried, 1990; Spinath & Steinmayr, 2008), and that shows that these self-perceptions are particularly important for enhancing intrinsic motivation (e.g. Bouffard, 2000; Marsh et al., 2005; Spinath & Spinath, 2005). Of the two constructs, self-efficacy was the better predictor. The differences between self-efficacy and self-concept were minimal for Internal Criteria for Success Motivation, however. The self-efficacy and self-concept models were comparable in its prediction and very few individual factors overall made an independent contribution to the models. It is difficult to determine why self-efficacy should predict this type of motivation less well than it does the others compared to self-concept. Maybe Internal Criteria for Success is more affectively orientated than the other motivation variables, which is why it is predicted less well by the primarily cognitive self-efficacy construct.

Self-efficacy was also shown to a better predictor of aspirations. There was also some indication that self-efficacy mediates the relationship between GCSE Science performance and educational aspirations. These findings support previous research that shows a relationship between self-efficacy/self-concept and aspirations (e.g. Nevid & Rathus, 2007; Super, 1990). They add to previous research by showing that self-efficacy is the stronger predictor the two. Conclusions made about the motivation and aspiration outcomes must be taken with slight caution, however, as the analyses failed to included motivation and aspiration control measures, which may have resulted in inflated relationships.

Academic self-perceptions were more important for the prediction of academic functioning than were non-academic self-perceptions. Typically, the factors that provided the most important independent contribution across all the models overall were academic: Self-Efficacy for Self-Regulated Learning, Self-Efficacy for Academic Achievement, Mathematics/Science Competency, and Scholastic Competence (self-concept). This supports previous research that shows stronger within-domain than cross-domain relationships (e.g. Bong & Clark, 1999; Bong & Skaalvik, 2003; Skaalvik, 1997a), and was expected given that academic self-perception demonstrates a more logical correspondence with academic functioning than it does with other types of functioning. Previously, this issue had only been examined using a small range of domains. This research extends these findings.

Generally, across all the academic outcomes, the differences between self-efficacy and self-concept models were less pronounced at the second-order level. That is, self-efficacy and self-concept showed similar utility for predicting academic functioning when the constructs were assessed using higher-order general measures. This further supports arguments that self-efficacy and self-concept become increasingly similar and highly related when assessed at more general levels (Lent, 1997; Pajares, 1996). This also supports the findings from the second-order aggregate factor analysis, i.e. there was substantial overlap of self-efficacy/self-concept components at this level, which indicates a lack of distinction between self-efficacy and self-concept. At this second-order level, academic self-efficacy was more predictive than academic self-concept, which again indicates that self-efficacy, with its greater cognitive component, has superior utility for predicting academic functioning.

These results show, therefore, that self-efficacy and self-concept are important in the development of academic performance, and might also be important in the development of intrinsic motivation and aspirations. Hence, the implication is that facilitating improvements in self-efficacy and self-concept through intervention might have a positive impact on these types of academic functioning. Of the two constructs, self-efficacy (especially self-efficacy percepts in academic contexts) is likely to have the greater influence.

Both self-efficacy and self-concept were very strongly predictive of self-esteem, self-concept especially so. This suggests that self-efficacy and self-concept percepts, especially self-concept, might be important for the development of self-esteem. In this instance, however, self-concept was the better predictor with self-concepts in more social contexts being particularly salient.

5.1.3 Does intervention have any affect on how the self is represented?

The intervention used in this study, which is a widely-used and Government-supported programme, was not particularly successful in facilitating improvements in self-perceptions, or for facilitating improvements in academic functioning. *Go For It!* did not affect any of the self-perception variables that the regression analyses indicated might be relevant to changing academic performance, motivation or aspirations. Hence, because GFI has not effectively manipulated the hypothesised causal variables, the experimental findings cannot provide any information about the causal relationships between self-perceptions and academic functioning.

Go For It! evidenced positive effects for only two self-perception variables: Close Friendship Self-Concept and Romantic Appeal Self-Concept. Furthermore, these effects were only for male students in the mainstream population. These aspects of self-concept were unrelated to academic functioning (as shown from the regression analyses). Therefore a positive representation of the self in these areas is unlikely to be pertinent in an educational environment, either for improving academic performance, or for raising motivation and aspirations. That the increase in these self-concepts was not accompanied by any significant changes (positive or otherwise) in any academic outcomes for these students supports this suggestion. Although the increase in these self-perceptions was small, proportionally, in relation to the size of the overall measurement scale, and the effect sizes were weak, these findings do indicate that the GFI intervention might be useful for enhancing middle adolescent males' perceived ability to cultivate interpersonal relationships. Such representations might ultimately benefit their behaviour in such situations. Had outcomes relative to such relationships been examined, the results might have shown whether self-representations of ability to form romantic and interpersonal relationships are likely to be influential in the development of functioning outside of an academic setting.

Unexpectedly, the intervention used here mainly resulted in a number of negative effects for a specific subgroup of students (those with special educational needs). The findings were specific to self-esteem and a limited number of self-concept, self-efficacy and self-competence factors, none of which were academic and were mainly associated with a 'high delivery' format of the intervention (more contact hours and more revisits). This was also unexpected as the programme originators claim that this type of delivery will result in more positive effects. However, there were only a very small number of SEN students, and the effect sizes were low, so any findings associated with these students must be interpreted with caution.

Typically, for SEN students, it was behavioural and physical representations of the self that were negatively affected in the longer term. Social representations of the self only seemed to be negatively affected in the short-term and these were back to normal by the end of the study. It is unclear why this should be the case. Perhaps there is something about how the programme is delivered that causes a temporary drop in perceived ability to function in social situations. Being able to interact socially seems to be particularly important in this context as the GFI intervention involves social activities: role play, team games, etc. Perhaps SEN students were overwhelmed by the extra social contact that is associated with the GFI sessions. This could be why, once they were away from the intervention environment, their perceptions stabilised. These results would suggest that self-perceptions are reactive towards external stimuli and threat; they can be quickly lowered or raised but can rapidly adjust once that stimuli or threat is removed.

It is also unclear why behavioural and physical representations should be negatively affected, or why this effect should persist. Maybe SEN students compared their behaviour and physicality (appearance and ability to undertake physical activities) with mainstream students and found themselves lacking. This could also be why there was a decrease in global self-esteem over the time of the study. Harter (1985b, 1986) and Hattie (1992) argue that it is whether or not one feels competent in a particular domain that determines whether such perceptions impact on overall self-esteem. Perhaps for special educational needs students, being able to behave, look good, and take part in physical and social interactions was particularly important to them. Therefore, because their competence in some or all of these areas was low, their self-esteem was negatively affected.

There were some changes (positive and negative) in both types of aspirations and in academic performance (GCSE Mathematics and English) for SEN students. It is entirely possible that these effects are associated with those observed for the self-perception variables, such that self-perceptions might have a causal influence over GCSE performance and aspirations. However, given the small SEN sample size this is unlikely. Moreover, we would expect influences on aspirations and performance to occur via changes in academic self-perception, rather than other types of self-perception (Bong, 2002; Bong & Clark, 1999). This is because, cognitively, there is a strong logical correspondence between judgements of competence to succeed academically, and academic performances and behaviours – between perceptions for undertaking mathematical tasks and actually doing well in mathematics subjects, for example (Pajares & Miller, 1995). Conversely, there is no logical correspondence between feeling that one is competent at building close friendships, for example, and mathematics performance. Thus, given that there were no effects (negative or otherwise) for any academic self-perception variables, it is not possible to conclude whether there might be a causal link between self-related perceptions and the aspiration, motivation and performance variables used here.

These results are inconclusive as to which self-perception is most susceptible to intervention. Self-concept perceptions were clearly the only self-perception construct that evidenced some positive change. But we cannot take this at face value because the intervention did not impact on the other self-perceptions in a useful way. This is disappointing; especially for an educational climate that values positive self-perceptions. These findings do not mean, therefore, that the other self-perception constructs are not subject to positive enhancement, only that the intervention used here was not useful as a means of facilitating such change.

Taking into account all the intervention findings (positive and negative), these support previous research that suggests it is possible to manipulate self-perceptions (e.g. Haney & Durlak, 1998; Hattie, 1992; O'Mara et al., 2006). The results also contrast previous research that argues that self-esteem and self-concept are highly fixed and stable, and not amenable to experimental intervention because of the way they are formed (Craven et al., 1991; Marsh & Yeung, 1998; Pajares & Graham, 1999; Shavelson & Bolus, 1982). However, the stable nature of self-esteem and self-concept may be one reason why there were not more positive effects on these constructs. It does not explain why there were no positive effects on self-efficacy (or self-competence), however, which is viewed as less stable. Nor does it explain why there were no effects (positive or otherwise) on academic self-perceptions, although this could be because they were not targeted using context-specific mastery interventions.

5.2 Educational and Theoretical Implications

5.2.1 Educational implications

UK education, as well as education across the world, has placed a heavy emphasis on increasing students' self-related perceptions, in the belief that they foster improved academic functioning. UK educational programmes (e.g. Circle Time, Aimhigher, SEAL) lay particular emphasis on increasing self-esteem, much more than they do other types of self-related perceptions. The commonly held belief is not only that positive self-esteem fosters improved academic outcomes but that it also has wider-ranging social and economic benefits.

The research presented here indicates, however, that schooling would not be best served by relying on self-esteem to increase academic functioning, especially when efforts are aimed at increasing academic performance or aspirations. The findings showed no significant predictive relationship between self-esteem and these outcomes. There was a very weak significant predictive relationship between self-esteem and Independent Mastery Motivation which indicates that there could potentially be a causal link between these constructs, but the lack of positive intervention effects on self-esteem and motivation mean that this cannot be tested. These results do not, therefore, justify facilitating improvements in self-esteem in order to foster improved academic functioning. This supports previous research that argues that global measures of the self do not have the power to explain academic behaviour (e.g. Baumeister et al., 2003).

Interventions designed to change self-esteem would therefore be unlikely to have an effect on subsequent academic outcomes. This does not mean that these types of interventions would not be useful, however. Research suggests that self-esteem is predictive of other things than performance and aspirations: goal orientation, expectations of success/failure, mental health and depression, for example (Skaalvik, 1997a). There may also be other benefits of increasing self-esteem that are independent of its supposed influence on academic functioning: improved self-worth leading to improved behaviour, perhaps. Facilitating improvements in self-esteem might therefore be a worthwhile educational goal in itself, but education's emphasis on using self-esteem to foster academic functioning seems ill-focused.

These findings suggest that self-efficacy and self-concept would be better aspects of the self to use to foster academic functioning. This is particularly true in the case of self-efficacy. Unfortunately, the intervention used in this study failed to produce significant and consistent positive effects for either of these self-perception constructs, or for any aspect of academic functioning, therefore it was not possible to test any potential causal links. There was, however, strong evidence of a predictive relationship between some aspects of self-efficacy and all the academic outcomes, particularly two aspects of motivation. There was also evidence of a predictive relationship between some aspects of self-concept and the academic outcomes, although this was weaker than for self-efficacy. This could indicate that the lack of positive intervention effects might be more related to the type of intervention used than to the lack of causal influence between these self-perceptions and the academic outcomes.

This research shows that mass delivery of the *Go For It!* intervention to whole cohorts does not give net benefits across all students, but does, in fact, negatively impact on some. Delivery of GFI in its current form might result in negative effects for SEN students; therefore administering GFI to these students should be avoided. The findings were clearly only compatible with the intervention having positive effect on two socially-related self-concept variables for males in the mainstream population. These results beg the question as to whether the GFI programme is worth using for whole year groups if it only benefits specific subgroups of students and has negative effects on other subgroups. They also beg the question as to whether GFI is worth using if it only positively impacts on the type of self-perceptions that have no useful relationship with academic functioning. Hence, the findings of this study do not support the use of the GFI programme, or programmes like it, as a successful vehicle for the whole scale manipulation of self-percepts in multiple contexts and for all types of students.

There are specific reasons why the GFI intervention in its current form did not work. The programme relies heavily on students using the self-talk strategies that it teaches. However, students' use of the strategies was very limited, especially for the 'low delivery' group. The correlations between strategy use and Academic Competency indicated that using strategies such as writing affirmations and visualising goals are important for improving these types of self-perceptions. The use of the writing affirmations strategy was particularly low, however. This might be one reason why there were no effects on academic self-perceptions generally. Strategies such as setting goals, listening to your own self-talk and talking positively to yourself were found to be significantly and positively related to performance in English, and indeed there was evidence of a positive effect on English performance for SEN students in the ‘high delivery’ group (who tended to make greater use of strategies). There was no indication that this positive effect was a result of positive changes in self-perceptions and SEN students formed only a tiny proportion of the sample, but it does demonstrate that the use of these types of strategies could have a direct impact on English performance. These findings support research that indicates that encouraging students to set goals facilitates better academic performance (Tanaka & Yamauchi, 2001; Zimmerman et al., 1992).

Using the strategies associated with GFI, and interventions like it, is therefore most important. Had the students on the GFI programme made greater use of the strategies they were taught, the implication is that they might have benefited from enhanced self-perceptions, and possibly improvements in academic functioning. There is one thing to note, however. The ‘high delivery’ format was particularly associated with students being more likely to report using the strategies that GFI teaches. One would expect, therefore, that this type of delivery would result in positive effects. However, there were a number of negative intervention effects in the ‘high delivery’ group for the small subgroup of SEN students, thereby indicating that greater use of strategies actually resulted in reduced self-perceptions and aspirations for these students. It is unclear why this would be the case. Perhaps these students found it difficult to put the strategies into action and it somehow impacted on their self-perceptions; maybe they formed the idea that they were somehow wanting in their abilities. It remains to be seen whether SEN students somehow responded differently to using these strategies than did mainstream students, or whether the result is connected to a wider ineffectiveness of the GFI intervention.

The results presented here have implications for the wider use of self-talk interventions *per se*. The indication is that these types of self-talk programmes are not useful for mass delivery in schools, although it is possible that when used selectively they may show effects for some students. However, such a sporadic pattern of positive and negative findings that have been shown here leads to questions about the actual value of delivering self-talk interventions such as these. These findings show that these types of programmes might not only reduce self-perception in some areas, but may also lead to reduced academic performance and lowered aspirations. Reduced levels of self-perception and academic functioning might then lead to feelings of inadequacy in other areas.

There are specific reasons as to why these types of self-talk interventions might not work. Because self-esteem and self-concept perceptions are typically formed through environmental experiences and reflected appraisals from others, they are viewed as relatively fixed and stable constructs and, as such, not easily susceptible to manipulation (Craven et al., 1991; Marsh & Yeung, 1998; Shavelson & Bolus, 1982). Therefore, it is questionable whether *any* kind of intervention will have its intended effect on these constructs. The main mechanism for developing positive self-efficacy is seen to be mastery experience of the task in hand (Bandura, 1986, 1997). Repeated success of the same or similar tasks is therefore the most likely way of facilitating positive gains in self-efficacy perceptions. Consequently, one might question whether interventions based on positive self-praise, which are not directed towards allowing focused, context-specific mastery experiences, are an effective mechanism for enhancing self-efficacy. Furthermore, given that self-esteem/self-concept and self-efficacy are typically formed via different mechanisms, one might also question the validity of using the same intervention as a mechanism for influencing all three self-perceptions. Hence, it may be that these types of self-talk interventions, especially when applied arbitrarily across whole-year cohorts, are too blunt to be effective.

It might also be that in order to be effective, self-perception intervention programmes need to focus on changing students' underlying values. As Reasoner (1992) has remarked in relation to self-esteem programmes: "efforts limited to making students 'feel good' are apt to have little lasting effect because they fail to strengthen the internal sources of self-esteem related to integrity, responsibility, and achievement" (p. 24). Katz (1993) suggests that self-orientated self-talk programmes are unlikely to succeed because asking students to chant hollow phrases that one is worthwhile is unlikely to positively impact on their underlying self-view, even if they do work temporarily. Katz also argues that with their heavy emphasis on personal and affective reactions, these programmes fail to encourage creative thinking and critical reflection. Critical and reflective thinking has been shown to be particularly important for the development of academic functioning (e.g. Phan, 2007, 2009; Toner & Rountree, 2003/2004). Hence, the implication is that interventions designed to modify self-perceptions should also be aimed at modifying creative and critical thinking, and critical reflection. Kohn (1994) suggests that self-oriented approaches to increasing self-beliefs are likely to fail because they overlook the political and economic realities of how that belief is created.

The implication is, therefore, (taking these findings and theoretical explanations into account), if we want to positively influence the types of academic functioning that are examined here, the optimal intervention should be aimed at modifying self-efficacy perceptions, rather than self-concept or self-esteem. Furthermore, interventions should also pay attention to a student's underlying values and the background political and social realities. The reciprocal effects model of causality has substantial implications for interventions designed to facilitate positive educational functioning; interventions are more likely to be short-lived if they fail to pay attention to improving performance *as well as* self-perceptions (Green et al., 2006; Marsh et al., 2002). This suggests that interventions should aim at providing mastery experiences for students rather than using self-orientated self-talk approaches to enhancing self-beliefs. This is because such experiences are likely to directly enhance performance (via practice of the task at hand) as well as modifying self-perceptions. Furthermore, we should be looking to focus more specifically on the subjects that we want to raise competence in. These need not be very specific but can be associated with regulating general academic abilities – giving students the opportunity to practice strategies aimed at helping them to organise their schoolwork, for example. This would then directly impact on their ability to self-regulate their learning and also impact on their perceived competence for this type of activity. Addressing all these issues is a tall order; it is not surprising, then, that educators fall back on catch-all interventions like that used in this study.

Given the lack of relationship shown here between self-esteem and the academic outcomes studied, it is concluded that we need not worry about attempting to enhance self-esteem in an educational context, not if the aim is to foster academic functioning. It may be that positively influencing self-esteem may have other benefits not associated with academic functioning, but one might question the value of using school-based interventions to raise self-esteem when there is unlikely to be any educational benefit. Besides, these results suggest that facilitating improvements in self-efficacy (and self-concept) might also positively impact on global self-esteem perceptions. Interventions that focus directly on self-concept might be of benefit in relation to educational outcomes, but these results suggest that self-concept is not as strongly related to academic functioning as is self-efficacy. Focusing on self-efficacy might, however, also have the welcome effect of enhancing students' self-concept. Skaalvik (1997a) argues that mastery experiences are just as important for the development of self-concept. He suggests that one has to have some degree and understanding of mastery to be able to attribute success internally (causal attributions are one of the main determinants of self-concept formation). Recent UK education has started to realise the benefit of raising students' self-efficacy as opposed to other self-perceptions, as is now evidenced in at least one of Aimhigher's regional project objectives (Aimhigher West Midlands website, 2011).

5.2.2 Theoretical implications

Self-efficacy and self-concept/self-esteem perceptions are viewed as being conceptually distinct. The latter two constructs are more concerned with the enduring aspects of a person's overall identity. Self-efficacy, on the other hand, is a more specific and not necessarily permanent attribution of the self. Self-efficacy represents the aspect of the self that deals almost exclusively with multidimensional, context-specific perceptions of competence. Self-concept deals with both affective and cognitive components of the self. It is a more encompassing representation of the self which incorporates many forms of feelings, attitudes and aspects of self-knowledge which include perceptions of self-esteem – the global, affective aspect of the self-concept. A critical question is whether individuals make these distinctions in their own perceptions. The findings presented here indicate that they do not always do so, especially at this younger adolescent age; overlap of self-efficacy and self-concept components at both domain-specific and higher-order levels has been demonstrated. It is not possible from these findings, therefore, to validate the conceptual distinctions between self-efficacy and self-concept that have been proposed in the literature, although the implication is that the more specifically representations of the self are measured, the more likely they are to represent distinct self-efficacy and self-concept components.

Self-esteem seems to be something different from self-efficacy; the relationship between these two constructs was weak. Individuals therefore make distinctions between what it means to be able to achieve a desired outcome and how they feel about themselves generally. This supports research presented by Chen, Gully and Eden (2004) which confirmed a theoretical distinction between self-efficacy and self-esteem. The conceptual distinction between self-esteem and self-concept is less clear, however. These findings showed a very strong relationship between self-concept and self-esteem. This suggests that even measures like the SPPA that emphasise cognitive aspects of self-concept, embrace some element of affective or emotional judgements of the self. Thus, the ability of individuals to make a distinction between how one feels about the self overall (self-esteem judgement) and how one feels about being competent at a particular activity (the affective element of self-concept) is limited. Making this distinction appears even less likely if being competent at that activity is important to the self in some way. This begs the theoretical question, therefore, of whether cognitive and affective dimensions of self-concept are actually separable, and if they are not, what implication does this have for the nature of the relationship between self-efficacy and self-concept?

At the most simplistic level, self-perceptions are an idea or set of ideas about the self (Rinn, Plucker, & Stocking, 2010). Evidence suggests that this set of ideas becomes more abstract and differentiated as a child progresses through adolescence (Erikson, 1968; Harter, 1986; Marsh & Ayotte, 2003). As such, more complex representations of the self take shape. At younger ages, however, self-representations are less complex and less differentiated. The indication is, therefore, that the nature of the self changes as it develops. This may be why there was not complete separation of self-efficacy and self-concept for students this age-group, especially at the second-order level. For example, students of this age might simply not understand the underlying differences between what it means to be able to make friends (self-concept perception) and what it means to be self-assertive (self-efficacy perception). They simply appear to see these two aspects of the self as part and parcel of the same underlying self-representation – in this case the social one. Conceptually, therefore, the underlying self-view, at least for this age-group, seems to be based on feelings of *general competence* rather than judgements of whether one can do something at the current time (self-concept) or whether one will be able to do it in the future (self-efficacy). Perhaps at this age, therefore, it makes more sense to use less distinct *self-competence* measures that can reliably pick up the less complex self. Distinct self-efficacy and self-concept measures might be more appropriate as a child's self-representation becomes more abstract and differentiated with age.

Theoretically, self-efficacy is a much more specifically focused construct than either self-esteem or self-concept. Therefore, in an educational context, the implication is that it is more to do with what is actually going on in the classroom; because it is context-specific it is much more likely to be related to the subjects which students actually take in school.

Self-efficacy is connected to experiences of what one has done is the past, and is more about how these experiences are attributed and explained in the self-schema. Self-efficacy theory therefore supports enhancing self-efficacy perceptions via mastery experiences. In contrast, the general view concerning self-esteem and self-concept is that it is somehow possible to impact on these constructs on a more global scale; somehow if we can positively influence self-esteem and self-concept, this will make a child feel better overall, and this will then benefit their widespread activities across school, both academically and otherwise. However, the theory behind self-esteem and self-concept formation is that it is influenced via the type of social and environmental experiences that are more likely to 'set' these perceptions within the self-schema. Frames of reference determinants of self-esteem and self-concept are particularly influential in forming a child's core values. Approaches to raising self-perceptions like the GFI programme do not account for all the potential social and environmental contributing factors that make up a person's self-schema, and they do not account for the core values of that person. They are therefore unlikely to impact on the types of self-perceptions that are formed via these influences.

One of main questions about modifying self-perceptions, therefore, relates to whether it is actually possible to do so by working on non-cognitive thoughts and behaviours – in this case by increasing positive self-talk – rather than by focusing specifically on the constructs and targeting the individual elements from which they are comprised. These results indicate that that the former of these is not possible. The implication is that taking a 'whole-person' approach to modifying self-perceptions is unworkable. This is to say that attempting to modify the totality of a child's thoughts and perceptions using one overall approach, especially one that does not recognise the context-specific nature of self-efficacy and self-concept perceptions, is unlikely to be beneficial. Whilst it might have some impact on random aspects of the self, it is unlikely to be effective on the self in its entirety.

The nature of the GFI programme appears to be based on changing affective self-referent thought-patterns – changing pessimistic thinking to optimistic thinking. One might expect, therefore, that it would be more likely to positively impact on self-perceptions that consist wholly or partly of affective elements of the self: self-esteem, for example, or self-concepts that are focused on affectively-orientated interpersonal activities. Theoretically, on the other hand, we would not expect a programme based purely on changing affective thought patterns to impact on cognitively-based self-efficacy and self-concept perceptions: academic self-perceptions, for example. Although there were no positive effects on self-esteem in this study, there were some effects on self-concepts for romantic and close friendship activities, as might be expected following this theoretical logic. There were no effects on any academic self-perceptions, as would also be expected. Hence, if the aim is to enhance academic activities, these findings support using interventions that are more orientated towards modifying specific cognitive aspects of the self, rather than those orientated towards modifying the self as a whole.

This links to what is specifically taught in subject areas – whether students are taught in a way that builds competence in terms of what they are actually doing, as opposed to bringing things like ‘the self’ into PHSE classes, for example, which is totally separate from teaching. Self-orientated interventions of the type used here suggest there is some kind of global mechanism that can in some sense make one feel wonderful. But by targeting this supposed mechanism we are not relating self-perceptions to how students are taught in specific subject areas, to what goes on in everyday teaching practice, or to how the teacher approaches learning. This begs the question of whether it is possible to have a mechanism for self-perception change in an educational environment that is separate from everything else that goes on in class. Schoon (2003) argues that interventions should be targeted at specific competencies and should aim to understand the functional utility of these competencies, i.e. the purpose that they serve in the wider school context. Bandura (1986) recommends that a guided mastery approach provides the optimal conditions of instruction to facilitate students’ competence and learning. This would then allow a student to build self-regulative capabilities for exploratory learning and strengthen their belief that they can exercise control over their academic development. Within this process of self-regulation are three sub-functions that determine the self-management of learning activities: *self-observation* (monitoring aspects on one’s own performance), *judgemental process* (evaluating one’s performance against personal standards and values), and *self-reaction* (cognitive and affective responses to those performance evaluations). Research has shown that educational programmes that foster these sub-functions of the self have been highly effective for enhancing academic performance and motivation (e.g. Schunk & Zimmerman, 1994, 1998). The theoretical view that aspects of learning are part of a process that is compared against an individual’s standards and values is also seen in motivation research.

This research has treated motivation as sitting on an essentially dichotomous orientation (intrinsic versus extrinsic) that has a number of different dimensions. These relate to independent mastery of tasks (as opposed to dependence on the teacher for help), internal criteria for success (as opposed to dependence on external sources of evaluation), and preference for challenge (as opposed to a preference for being assigned easy work). The findings presented here showed no effects of the intervention on intrinsic motivation, either directly or indirectly through the effect of the intervention on self-perceptions, despite there being evidence of a predictive relationship between self-perceptions and motivation.

Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable; extrinsic motivation refers to doing something because it leads to a separable outcome (Ryan & Deci, 2000). Extrinsic motivation has typically been seen as something that results in lower-quality learning, low student persistence and interest, and reduced levels of involvement in school (Sansone & Harackiewicz, 2000). In contrast, intrinsic motivation is seen to be something that results in higher-quality learning, greater persistence and interest, and greater involvement. It is therefore seen as something which should be encouraged. However, Ryan and Deci (2000) argue that theoretically, motivation should not be treated as having a dichotomous orientation. Rather, they see extrinsic motivation as consisting of different types of extrinsic motivations which differently impact on whether or not an individual chooses to do something. They argue that when extrinsically motivated actions are related to one's core values or an understanding of the utility of undertaking a task, then the accompanying behaviour is "self-endorsed and thus adopted with a sense of volition" (p. 55). This can result in the exhibited levels of learning, persistence, etc. that can closely approximate those associated with intrinsic motivation. These authors argue that understanding these types of extrinsic motivation is an important issue for educators. Hence, if this theoretical conceptualisation of intrinsic motivation had been adopted in this study, some impact on motivation might have been observed. This is to say that the GFI intervention might have been useful for effecting a move towards a more 'self-endorsed' extrinsic motivation.

Underlying Ryan and Deci's work is the idea that motivation is not so much related to different dimensions of intrinsic/extrinsic orientation but is more to do with a person's core values; being true to them and acting in a consistent way. This would indicate, therefore, that interventions of the form used here would be unlikely to impact on a student's level of motivation; you can attempt to manipulate motivation but if a student's core values are the most important thing to them, then modifying motivation on a superficial level is not going to have any lasting impact, if it works at all. This suggestion is particularly relevant to the population examined in this study. This particular area of the UK is renowned for having a culture that does not value education very much. Therefore, the implication is that using interventions designed to superficially manipulate motivation, which do not address the deeper issues behind why these students do not value education, has no practical utility. The findings here support this suggestion; there were no effects whatsoever on any of the motivation variables in this study. Therefore, if we want to effectively increase a student's motivation levels the implication is that we need to look at what is going on in their background. This would also mean that a whole-school, catch-all approach is unlikely to be suitable for every student. This relates to the arguments provided by Reasoner (1992) and Kohn (1994) discussed earlier: if positive self-perceptions and motivation rely to some extent on a student's underlying values, as well as relying on political and economic realities, then interventions such as GFI, no matter how closely they attend to theoretical conceptualisations of the self, are unlikely to be effective if they do not address these values and realities.

5.3 Limitations and Future Directions

5.3.1 Limitations

A major limitation of this study relates to the fact that the design was not randomised: the participants were not randomly assigned to treatment and control groups. This research was by default quasi-experimental, such that intervention and control groups were based on naturally occurring circumstances; it was down to individual schools to decide whether to implement GFI or not. Schools in this study had already 'opted-in' and therefore the option to randomise was not available. Control schools may also have been engaged in other interventions or had other activities going on in the classroom that equalled the effects provided by the GFI intervention. There was a small general upwards trend in self-perception and motivation variables for *both* intervention and control schools, which supports this suggestion. The nature of the data is, therefore, part of the reason why it has not been possible to conclusively address the question of whether self-perceptions can be enhanced. The strongest conclusion that can be drawn from this research is that the GFI intervention is no more effective than whatever else the control schools might have been doing.

Another major limitation is that the intervention was not specifically designed to address the empirical and theoretical background of each of the self-perception constructs. *Go For*

It! is an off-the-shelf package that has not previously been empirically tested to determine its success (or not) in effecting positive change in self-perceptions. The use of theory has not commonly been used in the development of these types of school-based interventions, as is evidenced by the multitude of interventions designed to enhance self-esteem. This is despite there being little evidence of a positive relationship between self-esteem and academic performance, and despite there being questions about the stability of self-esteem (and consequently its susceptibility to intervention), which occur as a function of how it is formed. Ideally, each aspect of an intention would be closely matched to the theoretical constructs that one is aiming to manipulate. This would enhance the validity of a successful intervention and make it easier to understand the processes underlying any change. It would also make it easier to replicate the intervention, and modify and improve its delivery without altering its essential underlying features, in order to achieve optimal success. The *Bright Ideas* programme, discussed in Chapter 4, was developed using theoretical considerations and would seem to be more successful at achieving its intended effects.

Linked to this is that fact that GFI was, in the main, not delivered by Pacific Institute facilitators (i.e. those from the company that developed the programme). In four of the five schools, programme facilitators were members of existing school staff who had previously completed training in delivering the programme. This is in contrast to the *Bright Ideas* programme that was delivered by trained school-based psychologists and counsellors that would be likely to have greater familiarity with the techniques and principles of *Bright Ideas*, and the psychological principles underlying its development. The psychologists and counsellors worked in conjunction with school staff and were therefore able to make use of teachers' expertise in classroom learning and dynamics, whilst also being able to advise them on the best ways to practise techniques in the classroom and provide booster session in the future. In this way, optimal fidelity to the programme could be achieved. This was something that was likely lacking in the delivery of the GFI programme; anecdotal evidence (informal discussions with teachers) indicated that in many cases, schools chose to deviate from the recommended mode of delivery – not all the 12 units of the programme were delivered or the content of one or more of the units was changed. Only the school where GFI was delivered by Pacific Institute facilitators adhered exactly to the GFI programme outline. However, this school failed to revisit the programme because it had no trained facilitators in the school. This is problematic as the Pacific Institute claims that optimal success is achieved only when the skills taught are reinforced, practiced and modelled regularly within everyday school situations. Whilst it was not possible to determine individual school effects because of the small sample size in some of the intervention schools, it is likely that the lack of fidelity to the GFI programme outline would have impacted on its effectiveness in some schools.

Another limitation relates to the small number of special educational needs students. The findings from the experimental study indicate that there might be some effects (positive and negative) associate with these students. However, it was not possible to make definitive conclusions as this group of students formed only 9% of the overall intervention sample. It remains to be seen whether the negative effects of the GFI intervention on SEN students would be evidenced using a larger sample of these students. One might question the ethical validity of repeating this research with a larger group, given the strong possibility that it might negatively impact on their self-perceptions and/or academic functioning.

The large amount of missing data in this study also meant that the intervention analyses were, by default, on a self-selecting sub-sample of the total number of possible students. There is no principled reason to believe that these variables should be less susceptible to change in this sub-sample of students, but this remains a possibility. The high missing data count was partly a consequence of low attendance at PHSE lessons, in which the measures were administered. Attendance at PHSE lessons was compulsory for Year 10 students in the schools sampled. It was therefore anticipated that responses would be maximised because student attendance would be high and attrition across times of testing would be low. However, in practice, attendance at PHSE lessons was somewhat sporadic, with large numbers of students in some schools choosing not to attend. This meant (1) that the possible sample base was reduced, and (2) that attrition across times of testing was high. PHSE lessons teach students life skills such as how to have healthy and positive relationships and lifestyles, manage their feelings, and become financially capable. It is possible that students do not see these as valuable lessons and therefore choose not to attend. This may also be why there were so few SEN students in the sample; the proportion of SEN students included here was much less than the national average for secondary schools (which tends to vary between 16% and 22%, depending on year; Department for Education statistics: includes statemented and non-statemented students). Perhaps SEN students saw PHSE lessons as less valuable to them than did mainstream students. They may also have chosen to not attend these lessons because they felt less confident in this environment.

It may also be the case that those students who chose not to attend PHSE lessons were also those that had low self-perceptions. It has been discussed in Chapter 4 that self-perceptions (for both intervention and control groups) were relatively high at baseline, and given this, that there may not have been scope for raising them. It was suggested that self-perceptions may have reached a limit due to self-perception interventions administered to students in earlier school years. However, there is another explanation for this: students with low self-perceptions at baseline may simply not have been included in the sample base because they were not in PHSE lessons at one or more times of testing. *Go For It!* may therefore have had its intended, positive effect on these students but this was impossible to determine because they had self-selected themselves out of the analyses. Hence, given the propensity of some students to 'opt-out' of attending PHSE lessons, despite the mandatory requirement to attend, it may have been more successful to deliver questionnaires in one of the core subject lessons (English, for example). Students may be more likely to attend such classes as they are seen as having more value. Students may also perceive that they are more likely to get into trouble if they do not turn up for core subjects, something they are perhaps not so concerned with in relation to PHSE lessons.

It was also recognised that the large amount of questionnaire items presented to students may have been partly responsible for the amount of missing data – students might simply had got bored with answering the questions. Whilst the pattern of missing data did not indicate that this was due to boredom (students who started the questionnaire tended to complete it), the length of the questionnaire may have impacted on the findings (students might not have taken as much care to answer the questions correctly in the latter stages of the questionnaire). Given that one of the aims of this research was to examine the factor structure of the MSPSE and SPPA, this necessitated the presentation of all the items in each measure; hence, it was not possible to reduce the length of the questionnaires. However, an attempt was made to control for boredom effects by counterbalancing the MSPSE and SPPA measures.

The large proportion of missing data also reduced the size of the sample for the factor analyses. Because of a lack of clarity about the structure of the MSPSE and the SPPA, and because current literature pertaining to the overlap of self-efficacy and self-concept does not offer a clear sense of any combined models that can be constructed, the factor analyses here were exploratory, rather than confirmatory. It would have been advantageous to examine internal factor replicability by randomly splitting the sample into two. Exploratory factor analysis could have then been run on one half of the sample and the resulting model could have been tested on the other half using confirmatory factor analysis techniques. However, this was not feasible as the sample for the exploratory analyses would not have been large enough to satisfy assumptions for sample size. Exploratory analyses only were conducted, therefore, but this limits the generalisability of the findings.

Another issue relates to the length of time between testing sessions. Marsh et al. (1999) caution against collecting multiple waves of data within the same school year as the interval may be too short for self-concept to have an effect on academic achievement. Whilst the achievement measure here was taken between 10 and 16 months after completion of the intervention, the other academic outcomes (motivation and aspirations) were taken concurrently with the self-perception variables. There may, therefore, not have been enough time after the intervention for effects to show up, and this may be why there were no effects on motivation and only very limited (negative) effects on aspirations. O'Mara et al. (2006) reported that intervention effect sizes on self-perceptions were larger when more time had lapsed between post-test and follow-up (up to 14 months). They suggested a 'sleeper effect' where the effects of intervention increase over time. This sleeper effect may be the reason why there were only limited positive effects on self-perception in this study. It may even be the case that the demonstrated negative effects might have turned into positive effects over time.

In this research, factors seen to influence the development of self-perceptions and academic performance (i.e. gender, previous academic performance/ability, SEN, and socio-economic status) were controlled for statistically. However one of the limitations of statistical control is that we cannot always be sure that all the relevant variables have been captured. Here, the existing influence of prior motivation and prior aspirations was not accounted for. This may be one reason why there were very strong predictive relationships between self-concept/self-efficacy and two aspects of motivation. Had previous levels of motivation been controlled for, this relationship might have been weaker. Had there been less missing data in the sample, it would have been possible to look at the lagged relationships between self-perceptions and motivation/aspirations at the different times of testing. For example, how self-perceptions predict motivation/aspirations at follow-up could have been examined, controlling for the influence of baseline scores. It might then have been possible to make some tentative conclusions about the nature of the causal relationship between self-perceptions and motivation/aspirations. However, regression analyses could only have been conducted using control students' responses in order to exclude the effects of the intervention. Given this, the sample size would have contravened sample size requirements and so these analyses were not undertaken. There may also have been another problem with using this approach. Changes in motivation and aspirations (as well as in the self-perception scores) were very small across time periods; these differences might not have been large enough to justify using baseline scores as the control measure.

The research presented here also has implications for research methodology in general. One of these relates to the issue of using self-report methodologies to assess psychological variables. The very nature of self-perceptions means that they need to be measured directly rather than indirectly (using observation or other-ratings, for example). Self-perceptions inherently refer to an individuals own view of the self, therefore they are most commonly measured using self-report instruments, with self-report questionnaires the most frequently used type of measure. They are simple to administer with large groups and are typically developed so that they are broadly applicable to a target age range (Fernandez-Ballesteros, 2004). Respondents typically refer to one of a set of statements, often presented using a Likert or Likert-type scale. Self-report rating scales are therefore typically scored as interval level data. The validity of self-report measures of self-perception has been questioned, however. The main issue is that of response bias, such that respondents answer questionnaire items in a way that is unrelated to item content (Byrne, 1996; Paulhus, 1991). The most common type of response bias is social desirability. Typically, respondents tend to answer in a socially acceptable way regardless of the 'true' answer – they give an answer they think the researcher expects to see, or answer in a way that reflects positively on their own abilities, beliefs, opinions, etc. (Cook & Campbell, 1979). The SPPA and the motivation measure used here were designed in such a way to discourage socially desirable responses. This was not the case for the MSPSE, however. It was not possible to change the format of the MSPSE prior to use as one of the aims of this study was to examine the structure of the MSPSE in its current format. It is recognised that the Likert format of the MSPSE may be problematic, however, although (Chan, 2009) argue that it is an 'urban myth' that self-report questionnaires produce poor quality data.

Note also another potential limitation of this research: results may be subject to shared method variance. This refers to the extent to which true relationships between variables may be biased when data are collected from the same source, at the same time, or in the same way (Friedrich, Byrne, & Mumford, 2009; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Method variance tends to inflate inter-item correlations. Therefore because alpha coefficients are computed from these correlations the coefficients may overestimate the proportion of true variance (Tepper & Tepper, 1993). Effort was taken to control for potential shared method bias, with self-efficacy/self-concept measures being counterbalanced and different item/scale formats being used for each measure. This is in response to Podsakoff et al. (2003), who suggest that using the same or similar item/scale formats to measure different constructs increases the possibility of shared method variance, such that some of the covariance among the constructs may result from consistency in the scale properties, rather than the content of the items.

5.3.2 Future directions

Having examined the issues presented in this thesis, some suggestions are offered here that might help to guide educational practice and subsequent research in this area. The first, and possibly the most important suggestion is that it should be a matter of educational policy that the utility of educational innovations be examined using randomised controlled trials before they are rolled out for widespread use in schools. Randomised controlled trials can be useful in assessing the effectiveness of an intervention as if it were used for real, and the results of such trials reflect the true nature of the programme implementation (Hutchison & Styles, 2010). Random allocation of participants allows the influence of statistical control variables to be addressed at the design stage. Furthermore, otherwise unknown and complex factors that are prevalent in an educational environment are more likely to be balanced out through randomisation. The use of randomised controlled trials also limits the risk of exposing children to possible harm as a result of initiatives that have not been properly tested.

Also of immense importance is that educational interventions need to be motivated more by adherence to theory. This is partly to be able to test theoretical claims more closely, but also to achieve more efficient interventions. The assumption that academic functioning can be explained in terms of theories relating to self-related perceptions offers a way to systematically develop interventions designed to change these perceptions and subsequent academic activities. For example, if there is evidence that a specific behaviour is influenced by one type of self-perception, then interventions could include components that target these factors. In this study, self-efficacy demonstrated the strongest relationships with the academic outcomes examined. This suggests that future interventions should focus on enhancing self-efficacy if the aim is to positively impact on academic functioning. Self-efficacy theory explicitly states that the greatest change is likely to be evidenced if interventions focus on more context-specific, rather than general, aspects of the self. Here, Self-Efficacy for Self-Regulated Learning was the factor that exhibited the strongest relationships with the academic outcomes overall. This indicates that future interventions would be best served by focusing on this aspect of self-efficacy. Self-efficacy theory also suggests that the optimal way to enhance self-efficacy perceptions is to do so via mastery experiences. Therefore, future interventions would be best served by allowing directed practice of the specific task or activity that one aims to enhance. In this way, explicit use of self-efficacy theory provides a framework for designing and evaluating interventions aimed at enhancing self-efficacy and subsequent academic behaviour, for interpreting and predicting such behaviour, and for evaluating causal mechanisms. Only when interventions target the salient underpinnings of representations of the self will behavioural intentions and behaviour change.

Taking these points into account, future research might like to aim at enhancing cognitive self-processes, rather than affective self-processes, and allow for mastery experiences of the task in hand. The intervention should be short and focused on enhancing cognitive self-regulation processes, specifically self-efficacy, as these evidence the strongest relationships with academic performance (specifically science performance). It would therefore be better to examine this aspect of performance, rather than mathematics or English. A shorter and more focused intervention would also be more likely to maintain students' interest. A brief self-efficacy measure could be administered to students to examine the effects of the intervention; this would limit boredom effects associated with completing a longer questionnaire, as might have been demonstrated here. The effects of the intervention would be better examined using a randomised controlled trial – this would examine whether the intervention is working and allow for amendments to be made to the programme in relation to what is identified as being needed.

One of the main points of this thesis relates to the specificity at which self-efficacy/self-concept is measured. The research presented here supports Skaalvik and Rankin's (1996b) argument that measurement specificity is more important than how self-efficacy and self-concept items are formed; that is, whether items are given a future/past orientation, or whether they are constructed as 'can' or 'being' questions. This links to how self-perceptions become more differentiated with age. More global measures that do not differentiate in temporal orientation or question type might more reliably pick up less complex assessments of the self. Clearly there is then the question of whether these types of measures assess self-efficacy, self-concept or self-competence perceptions. Hence, future research might like to compare questions that have a future and 'can' orientation with an identical set that have a past and 'being' orientation to determine the nature of the resulting factor structures within and across different age-groups. Critical questions to be answered are: 'At what age do self-concept and self-efficacy start to diverge?' and 'Should we be measuring a more generally defined "self-competence" below this age?'

This relates to another point about *what* self-efficacy and self-concept measures actually assess. Domain-specific measures such as the MSPSE and SPPA are based on scales representing a compromise between subject-specific behaviours and generality, i.e. dimensions are inferred from more narrowly defined tasks in more specific sub-domains (Marsh et al., 1991). Consequently, domain-specific measures within the same general domain may assess slightly different aspects of self-concept or self-efficacy. In this research, for example, some MSPSE and SPPA domains were not directly comparable. This was particularly evident for the academic domains; the MSPSE academic items assess self-efficacy across different kinds of disciplines, whilst the SPPA academic items assess self-concept for specific activities related to academic learning in general. This points to the importance of conducting research that compares self-efficacy and self-concept perceptions using exactly the same sets of items, with only the time orientation and can/being orientation differently phrased to reflect self-efficacy or self-concept constructs. It may be that research examining whether self-efficacy and self-concept are distinct might achieve complete overlap of items at the domain-specific level if the phrasing of items within self-efficacy and self-concept measures is the same.

This research indicates that measures of self-competence are useful for predicting various aspects of academic functioning. It was not possible, however, to make definitive conclusions about the susceptibility of self-competence to manipulation in relation to the other self-percepts. Nor was is possible to determine the causal role of self-competence in relation to academic functioning, compared to the other self-percepts. This was because the intervention used in this study proved unsuccessful at effecting positive change in self-competence. Despite this, the indication is that self-competence is likely to have at least as much causal influence as self-concept. It would be useful, therefore, to repeat this research using another type of intervention. There is little value in including self-esteem in future comparisons, however; the results presented here suggest that self-esteem is not particularly influential in the development of academic functioning. Hence, the suggestion is that future research concentrate on comparing self-efficacy, self-concept and self-competence. In addition, the different competency factors might well be affected by different manipulations or different interventions that might well affect one factor to a greater extent than the other. Future research will help to establish whether this is the case. It might also be useful to compare the predictive utility of self-competence perceptions across various age-groups or using longitudinal designs that have more time between testing sessions than that used here. A specific question to be answered is whether age-related differentiation of self-competence affects the predictive utility of first- and second-order competency factors.

Research incorporating longitudinal designs, and/or different age-groups, might also help to clarify the nature of age-related differentiation of self-perceptions in relation to the structure of self-efficacy and self-concept, as well as in relation to self-competence. It would be specifically interesting to investigate whether self-regulatory efficacy is something that first develops within an academic domain for younger students, and then becomes something which generalises across other aspects of a person's life, forming separate distinct dimensions (as evidenced in the first-order analyses) as one gets older. Such designs would also make it possible to assess whether self-competence representations of the self break down into more distinct self-efficacy and self-concept representations with age.

It would also be advantageous to conduct research with different cultures; the observed differences between the structures presented here and those proposed by other researchers may simply be because such research was undertaken with a different cultural sample. In addition, repeating the research using confirmatory factor analysis with a larger sample would help to determine whether the factor structures can be reliably replicated, and conducting similar analyses with different measures would help to determine whether the findings can be generalised. Other issues relate to examining the MSPSE using something other than a Likert measurement format to address issues of social desirability response bias, and including additional controls to minimise shared method variance; for example, randomly presenting items that measure different constructs or administering the measures over more than one sitting.

This study was limited in that the intervention failed to result in any consistent positive effects. There was, therefore, no basis for further investigating causal influences. Given that any future intervention studies result in positive effects on both self-perceptions and academic outcomes, research would be well served by examining the causality issue using structural equation modelling (SEM).

Structural equation modelling is a statistical technique that makes it possible to estimate the complex causal relationships between multiple independent and dependent variables. The primary goal of SEM is to assess the validity of a causal process or model. Theoretically plausible causal models of the relationships between variables are hypothesised and tested to determine which gives the best overall fit to the data. These models are often visualised using a path diagram. Structural equation modelling also makes it possible to examine whether there is a direct effect between the independent and dependent variables or whether the relationship is mediated by another variable (Byrne, 2010; Ullman, 2001). Marsh et al. (1999) outline a number of criteria for using SEM to examine the causal influence of self-perceptions (they discuss these guidelines in relation to self-concept but state that the principles generalise to other psychological constructs). One of the recommendations they give is that self-perception and academic outcome indicators should be measured at least twice and preferably more frequently, with more than a year separating each testing phase. This would therefore allow time for any impact on academic performance and other outcomes to take effect.

Marsh and colleagues also suggest that when using SEM it is preferable to measure academic outcome indicators more frequently than twice and measures should include multiple factors/domains, each containing at least three indicators per factor. Here, academic performance was measured only twice (after the self-perception measure and before, but not concurrently with), and the two academic performance measures used different types of indicator (KS3 performance and GCSE performance). Furthermore, the academic performance and aspiration measures were not based on multiple indicators, but on general indicators. Marsh et al. (1999) guard against using general measures of achievement, such as school grades, because they do not allow for the effects of true stability over time to be partialled out. The same would be true of aspiration measures based on one score, as they were here. If this research were to be repeated, therefore, the optimal design would be for additional follow-up measures to be taken at around one year after completion of the programme. This would make it possible to determine whether the limited and negative effects of the programme are associated with a sleeper-effect of the intervention, or are associated with the design of the intervention *per se*. Academic outcome measures should be taken concurrently with the self-perception measures and also one year following to determine how self-perceptions affect future performance/behaviour. Prior measures of motivation and aspiration measures should also be included to allow for their influence on self-perceptions. Academic performance and aspiration measures would also be better constructed using multiple indicators, although the difficulty of doing this in the case of academic performance is recognised.

This type of research design would also allow for the reciprocal effects of self-perceptions and academic outcomes to be examined. It has been argued that self-efficacy and self-concept might have a reciprocal relationship with academic performance, such that self-perceptions not only have a causal influence over performance, but also that performance has a causal influence over self-perceptions (Bandura, 1997; Marsh, 1990b; Marsh & Craven, 2006).

Structural equation modelling would also allow for the reciprocal and mediational effects of self-perceptions on motivation to be examined. One aim of this research was to determine the extent to which self-perceptions might be influential in the development of motivation. Intrinsic motivation has been examined here as an academic outcome variable, with measures being taken at the same time as the self-perception and aspiration measures. However, research has suggested that motivation may act as a mediating variable between self-perceptions and academic performance (Bandura, 1997; Marsh et al., 2005; Norwich, 1987; Skaalvik & Rankin, 1995). There are also suggestions that the relationship between self-perceptions and motivation might be reciprocal (Marsh et al., 2005; Skaalvik & Valas, 1999b). If this is the case, it would suggest that interventions aimed at improving self-perceptions would not be of benefit unless motivation is also directly targeted.

The research presented here has yielded some important findings for current guidelines advocating that to improve academic functioning we should improve students' self-perceptions. The clear implication is that researchers and educators need to reassess their reliance on enhancing students' self-esteem as a mechanism for facilitating positive academic functioning. There is no evidence that educators should turn their focus towards other self-related perceptions, however, not when the strategies for self-perception enhancement are provided via the types of interventions utilised here. There may be more benefit from focusing interventions directly on building students' self-perceptions through mastery experiences in educational subjects where they have a deficit; the indication is that the focus should be on modifying self-efficacy, rather than the other self-percepts. Hopefully, these suggestions for future research will aid self-perception theorists and researchers in developing new directions for enquiry that will provide a useful contribution to educational theory and practice.

6 REFERENCES

Acock, A. C. (2005). Working with missing values. *Journal of Marriage and Family, 67*, 1012-1028.

Aimhigher (2007). *Aimhigher induction pack*. Aimhigher. Available at http://www.aimhigher.ac.uk /sites/practitioner/resources/Aimhigher%20induction%20pack%20-%20Feb%2007.pdf [accessed 21st March 2011].

Aimhigher West Midlands website (2011). *Supporting the transition and progression of Gifted and Talented WP students.* Available at http://www.aimhigherwm.org/content.aspx?CategoryID=1079 [accessed 16th March 2011].

Allison, P. D. (1999). *Multiple regression: A primer*. London: Sage Publications.

Allison, P. D. (2000). *Missing data*. Thousand Oaks, CA: Sage Publications.

Ames, R. (1983). Help-seeking and achievement orientation: Perspectives from attribution theory. In B. DePaulo, A. Nadler & J. Fisher (Eds.), *New directions in helping* (pp. 165-188). New York: Academic Press.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*, 261-271.

Anastasi, A. (1982). *Psychological testing* (5th ed.). New York: MacMillan.

Ayres, R., & Cooley, E. (1990). Self-concept, attribution, and persistence in learning-disabled students. *Journal of School Psychology, 28*(2), 153-163.

Bachman, J. G., & O'Malley, P. M. (1977). Self-esteem in young men: A longitudinal analysis of the impact of educational and occupational attainment. *Journal of Personality and Social Psychology, 35*, 365-380.

Baharudin, R., & Luster, T. (1998). Factors related to the quality of the home environment and to children's achievement. *Journal of Family Issues, 19*(4), 375-403.

Baldwin, S. A., & Hoffman, J. P. (2002). The dynamics of self-esteem: A growth-curve analysis. *Journal of Youth and Adolescence, 31*(2), 101-113.

Bandalos, D. L., Yates, K., & Thorndike-Christ, T. (1995). Effects of math self-concept, perceived self-efficacy, and attributions for failure and success on test anxiety. *Journal of Educational Psychology, 87*, 611-623.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behaviour change. *Psychological Review, 84*, 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122-147.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood, NJ: Prentice-Hall.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44*(9), 1175-1184.

Bandura, A. (1990). *Multidimensional Scales of Perceived Self-Efficacy*. Stanford, CA: Stanford University.

Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies*. New York: Cambridge University Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

Bandura, A. (2001). *Guide for constructing self-efficacy scales* (Revised ed.). Stanford, CA: Stanford University.

Bandura, A. (2006). *Guide for creating self-efficacy scales*. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich, CT: Information Age Publishing.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Development, 67*(3), 1206-1222.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development, 72*(1), 187-206.

Bandura, A., Pastorelli, C., Barbaranelli, C., & Caprara, G. V. (1999). Self-efficacy pathways to childhood depression. *Journal of Personality and Social Psychology, 76*, 258-269.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 45*(5), 1017-1028.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88*(1), 87-99.

Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*, 586-598.

Bank, M., & Woolfson, L. (2008). Why do students think they fail? The relationship between attributions and academic self-perceptions. *British Journal of Special Education, 35*(1), 49-56.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Barrett, P. M., Webster, H. M., & Wallis, J. R. (1999). Adolescent self-esteem and cognitive skills training: A school-based intervention. *Journal of Child and Family Studies, 8*(2), 217-227.

Bartlett, M. S. (1954). A note of the multiplying factors for various chi-square approximations. *Journal of the Royal Statistical Society, 16 (Series B)*, 296-298.

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*(1), 1-44.

Beauchamp, P. H., Halliwell, W. R., Fournier, J. F., & Koestner, R. (1996). Effects of cognitive-behavioral psychological training on the motivation, preparation, and putting performance of novice golfers. *Sport Psychologist, 10*, 157-170.

Betz, N. E., & Hackett, G. (1986). Applications of self-efficacy theory to understanding career choice behavior. *Journal of Social and Clinical Psychology, 5*, 279-289.

Bernaards, C. A., & Sijtsama, K. (2000). Influence of imputation and EM methods on factor analysis when item nonresponse in questionnaire data is nonignorable. *Multivariate Behavioral Research, 35*(3), 321-364.

Biggs, J. B. (1997). *Student approaches to learning and studying*. Melbourne: Australian Council for Educational Research.

Bong, M. (1997). Generality of academic self-efficacy judgements: Evidence of hierarchical relations. *Journal of Educational Psychology, 89*(4), 696-709.

Bong, M. (1999). Personal factors affecting the generality of academic self-efficacy judgements: Gender, ethnicity, and relative expertise. *Journal of Experimental Education, 67*, 315-331.

Bong, M. (2001). Between- and within-domain relations of academic motivation among middle and high school students: Self-efficacy, task- value, and achievement goals. *Journal of Educational Psychology, 93*(1), 23-34.

Bong, M. (2002). Predictive utility of subject-, task-, and problem-specific self-efficacy judgements for immediate and delayed academic performances. *Journal of Experimental Psychology, 70*(2), 133.162.

Bong, M. (2004). Academic motivation in self-efficacy, task value, achievement goal orientations, and attributional beliefs. *Journal of Educational Research, 97*, 287-297.

Bong, M., & Clark, R. E. (1999). Comparison between self-concept and self-efficacy in academic motivation research. *Educational Psychologist, 34*(3), 139-153.

Bong, M., & Hocevar, D. (2002). Measuring self-efficacy: Multitrait-multimethod comparison of scaling procedures. *Applied Measurement in Education, 15*(2), 143-171.

Bong, M., & Skaalvik, E. M. (2003). Academic self-concept and self-efficacy: How different are they really? *Educational Psychology Review, 15*(1), 1-40.

Bono, J. E., & Judge, T. A. (2003). Core self-evaluations: A review of the trait and its role in job satisfaction and job performance. *European Journal of Personality, 17*, S5-S18.

Bouffard, T. (2000). *Changes in self-perceptions of competence and intrinsic motivation among elementary school children.* Paper presented at the American Educational Research Association, New Orleans.

Bowden, M. P., & Doughney, J. (2010). Socio-economic status, cultural diversity and the aspirations of secondary students in the Western Suburbs of Melbourne, Australia. *Higher Education, 59*(1), 115-129.

Box, G. E. P. (1949). A general distribution theory for a class of likelihood criteria. *Biometrika, 36*(3-4), 317-346.

Boyer, D. A., Zollo, J. S., Thompson, C. M., Vancouver, J. B., Shewring, K., & Sims, E. (2000). *A quantitative review of the effects of manipulated self-efficacy on performance.* Paper presented at the American Psychological Society, Miami, FL.

Brandon, C. M., & Cunningham, E. G. (1999a). *Bright Ideas Manual*. Melbourne: Oz Child Australia.

Brandon, C. M., & Cunningham, E. G. (1999b). *Bright Ideas Workbook*. Melbourne: Oz Child Australia.

Brandon, C. M., Cunningham, E. G., & Frydenberg, E. (1999). Bright Ideas: A school-based program teaching optimistic thinking skills in pre-adolescence. *Australian Journal of Guidance and Counselling, 9*, 153-163.

Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. *Econometrica, 47*, 1287-1294.

Bridges, K. R. (2001). Using attributional style to predict academic performance: How does it compare to traditional methods? *Personality and Individual Differences, 31*(5), 723-730.

Brookover, W. B., Thomas, S., & Paterson, A. (1964). Self-concept of ability and school achievement. *Sociology of Education, 37*, 271-278.

Brophy, J. (1981). Teacher praise: A functional analysis. *Review of Educational Research, 51*(1), 5-32.

Brown, J. D. (1993). Motivational conflict and the self: The double-bind of low self-esteem. In R. F. Baumeister (Ed.), *Self-esteem: The puzzle of low self-regard* (pp. 117-130). New York: Plenum.

Brown, J. D. (2008). Effect size and eta-squared. *Shiken: JALT Testing and Evaluation SIG Newsletter, 12*(2), 38-43.

Byrne, B. M. (1984). The general/academic self-concept nomological network: A review of construct validation research. *Review of Educational Research, 54*(3), 427-456.

Byrne, B. M. (1996). *Measuring self-concept across the lifespan. Issues and Instrumentation.* Washington, DC: American Psychological Association.

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications and programming*. Hove, East Sussex: Routledge.

Byrne, B. M., & Shavelson, R. J. (1986). On the structure of adolescent self-concept. *Journal of Educational Psychology, 78*, 474-481.

Byrne, B. M., & Shavelson, R. J. (1996). On the structure of social self-concept for pre-, early, and late adolescents: A test of the Shavelson et al. (1976) model. *Journal of Personality and Social Psychology, 70*(3), 599-613.

Byrne, B. M., & Worth Gavin, D. A. (1996). The Shavelson Model revisited: Testing for structure of academic self-concept across pre-, early, and late adolescents. *Journal of Educational Psychology, 88*, 215-228.

California Task Force to Promote Self-Esteem and Personal and Social Responsibility (1990). *Toward a state of esteem: The final report of the California Task Force to Promote Self-Esteem and Personal and Social Responsibility*. Sacramento, CA: California State Department of Education, Bureau of Publications.

Callicott, K. J., & Park, H. (2003). Effects of self-talk in academic engagement and academic responding. *Behavioral Disorders, 29*(1), 48-64.

Campbell, J. D., & Lavellee, L. F. (1993). Who am I? The role of self-concept confusion in understanding the behaviour of people with low self-esteem. In R. F. Baumeister (Ed.), *Self-esteem: The puzzle of low self-regard* (pp. 3-20). New York: Plenum Press.

Chan, D. W. (2001). Global and specific self-concepts of gifted adolescents on Hong Kong. *Journal for the Education of the Gifted, 24*(4), 344-364.

Chan, D. (2009). So why ask me? Are self report data really that bad? In C. E. Lance & R. J. Vandenberg (Eds.), *Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences* (pp. 309-335). New York: Routledge.

Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research, 58*, 347-371.

Chapman, J. W., & Tunmer, W. E. (1995). *Reading self-perceptions and beginning reading achievement of first-year school children.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Chapman, J. W., & Tunmer, W. E. (1997). A longitudinal study of beginning reading achievement and reading self-concept. *British Journal of Educational Psychology, 67*, 279-291.

Charbonneau, D., & Nicol, A. A. M. (2002). Emotional intelligence and prosocial behaviors in adolescents. *Psychological Reports, 90*(2), 361-370.

Chen, G., Gully, S. M., and Eden, D. (2004). General self-efficacy and self-esteem: Toward theoretical and empirical distinction between correlated self-evaluations. *Journal of Organizational Behaviour, 26*(3), 375-395.

Cheng, P. Y., & Chiou, W. B. (2010). Achievement, attributions, self-efficacy, and goal setting by accounting undergraduates. *Psychological Reports, 106*, 1-11.

Choi, N., Fuqua, D. R., & Griffin, B. W. (2001). Exploratory analysis of the structure of scores from the Multidimensional Scales of Perceived Self-Efficacy. *Educational and Psychological Measurement, 61*(3), 475-489.

Chowdry, H, Crawford, C, & Goodman, A. (2010). *The role of attitudes and behaviours in explaining socio-economic differences in attainment at age 16.* Institute for Fiscal Studies, Working Paper 10/15.

Christensen, T. B., Fogarty, T. J., & Wallace, W. A. (2002). The association between the directional accuracy of self-efficacy and accounting course performance. *Issues in Accounting Education, 17*(1), 1-26.

Clark-Carter, D. (1997). *Doing quantitative psychological research: From design to report*. East Sussex, UK: Psychology Press.

Coe, R. (2000). *What is an 'effect size'? A brief introduction*. Available at http://www. cemcentre.org/evidence-based-education/effect-size-resources [accessed 20th March 2011].

Coe, R. (2002). *It's the effect size, stupid: What effect size is and why it is important.* Paper presented at the Annual Conference of the British Educational Research Association, University of Exeter, UK.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Collins, J. L. (1982). *Self-efficacy and ability in achievement behavior.* Paper presented at the American Educational Research Association, New York.

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis issues*. Boston, MA: Houghton Mifflin Company.

Cooley, C. H. (1902). *Human nature and the social order*. New York: Scribner.

Coopersmith, S. (1967). *The antecedents of self-esteem.* San Francisco: W. H. Freeman.

Covington, M. V. (1984). The self-worth theory of achievement motivation: Findings and Implications. *Elementary School Journal, 85*, 5-20.

Covington, M. V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. Cambridge: Cambridge University Press.

Craig, L. S. (2004). *Does the Bright Ideas program build resilience in young people?* Unpublished Masters thesis, Swinbourne University of Technology, Victoria, Australia.

Craven, R. G., Marsh, H. W., & Debus, R. L. (1991). Effects of internally focused feedback and attributional feedback on enhancement of academic self-concept. *Journal of Educational Psychology, 83*(1), 17-27.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334.

Cunningham, E. G. (2002a). *Developing coping resources in early adolescence: Evaluation of control-related mechanisms in a universal health promotion intervention.* Unpublished Doctoral thesis, University of Melbourne, Australia.

Cunningham, E. G. (2002b). Enhancing coping resources in early adolescence through a school-based program teaching optimistic thinking skills. *Anxiety, Stress and Coping, 15*, 369-381.

Cunningham, E. G., Brandon, C. M., & Frydenberg, E. (1999). Building resilience in early adolescence through a universal school-based prevention program. *Australian Journal of Guidance and Counselling, 9*, 15-24.

Cunningham, E. G., Brandon, C. M., & Frydenberg, E. (2002). Enhancing coping resources in early adolescence through a school-based program teaching optimistic thinking skills. *Anxiety, Stress and Coping, 15*(4), 369-381.

Cunningham, E. G., & Frydenberg, E. (2000). *Developing coping resources in early adolescence within the context of whole-school curriculum.* Paper presented at the 35th Australian Psychological Society Annual Conference, Canberra, Australia.

D'Amico, A., & Cardaci, M. (2003). Relations among perceived self-efficacy, self-esteem, and school achievement. *Psychological Reports, 92*, 745-754.

Damon, W., & Hart, D. (1982). The development of self-understanding from infancy through adolescence. *Child Development, 53*, 841-864.

Davis, J., & Brember, I. (1999). Reading and mathematics attainments and self-esteem in Years 2 and 6: An eight-year cross-sectional study. *Educational Studies, 25*, 145-157.

DCLG/DCSF (Department for Communities and Local Government/Department for Children, Schools and Families, 2008). *Aspiration and attainment amongst young people in deprived communities: Analysis and discussion paper. Cabinet Office Social Exclusion Task Force Short Studies*. London: Cabinet Office.

DCSF (Department for Children, Schools and Families, 2007). *Aiming high for young people: A ten year strategy for positive activities*. London: HM Treasury.

DCSF (Department for Children, Schools and Families, 2010a). *Aiming high for young people – Three years on: Evidence annex*. London: HM Treasury.

DCSF (Department for Children, Schools and Families, 2010b). *Early intervention: Securing good outcomes for all children and young people*. London: DCSF.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum.

Deci, R. M., & Ryan, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

DfEE (Department for Education and Employment, 1997a). *Excellence for all children: Meeting special educational needs*. London: HMSO.

DfEE (Department for Education and Employment, 1997b). *Excellence in schools*. London: HMSO.

DfEE (Department for Education and Employment, 1999). *Learning to succeed: A new framework for post-16 learning*. London: HMSO.

DfES (Department for Education and Skills, 2004). *Five year strategy for children and learners*. London: HMSO.

DfES (Department for Education and Skills, 2005a). *14-19 Education and skills*. London: HMSO.

DfES (Department for Education and Skills, 2005b). *Primary national strategy. Excellence and enjoyment: Social and emotional aspects of learning – Guidance booklet.* Nottingham, UK: DfES publications.

DfES (Department of Education and Skills, 2007). *Secondary national strategy. Social and emotional aspects of learning for secondary schools – Guidance booklet*. Nottingham, UK: DfES Publications.

Di Paula, A., & Campbell, J. D. (2002). Self-esteem and persistence in the face of failure. *Journal of Personality and Social Psychology, 83*, 711-724.

Dixon, F. A., Cross, T. L., & Adams, C. M. (2001). Psychological characteristics of academically gifted students in a residential setting: A cluster analysis. *Psychology in the Schools, 38*(5), 433-445.

Downey, R. G., & King, C. V. (1999). Missing data in Likert ratings: A comparison of replacement methods. *Journal of General Psychology, 125*, 175-189.

Dubois, D. L. (2001). *Family disadvantage, the self, and academic achievement*. New York: Routledge Falmer.

Dubois, D. L., & Tevendale, H. D. (1999). Self-esteem in childhood and adolescence: Vaccine or epiphenomenon. *Applied and Preventative Psychology, 8*, 103-117.

Durlak, J. A., & Wells, A. M. (1997). Primary prevention mental health programs for children and adolescents: A meta-analytic review. *American Journal of Community Psychology, 25*(2), 115-152.

Dweck, C., & Leggett, E. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

Eccles, J. S. (1987). Gender roles and women's achievement-related decisions. *Psychology of Women Quarterly, 11*, 135-172.

Eccles, J. S. (1993). School and family effects on the ontogeny of children's interests, self-perceptions, and activity choices. In J. Jacobs (Ed.), *Nebraska Symposium on Motivation, 1992: Developmental perspectives on motivation* (pp. 145-208). Lincoln, NB: University of Nebraska Press.

Eccles, J. S. (2007). Families, schools, and developing achievement-related motivations and engagement. In J.E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization: Theory and research* (pp. 665-691). New York, NY: Guilford Press.

Eccles, J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation* (pp. 75-146). San Francisco, CA: W. H. Freeman.

Eccles, J. S., & Wigfield, A. (1995). In the mind of the achiever: The structure of adolescents' academic achievement related-beliefs and self-perceptions. *Personality and Social Psychology Bulletin, 21*, 215-225.

Eccles, J. S., Wigfield, A., Harold, R., & Blumenfeld, P. B. (1993). Age and gender differences in children's self- and task perceptions during elementary school. *Child Development, 64*, 830-847.

Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology. Vol. 3: Social, emotional and personality development* (pp. 1017-1095). New York: Wiley.

Elliot, A. (1997). Integrating the "classic" and "contemporary" approaches to achievement motivation: A hierarchical model of approach and avoidance achievement motivation. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 143-179). Greenwich, CT: JAI Press.

Ellis, A. (1962). *Reason and emotion in psychotherapy*. Secaucus, NJ: Lyle Stuart.

Ellis, A. (1975). Rational-emotive therapy and the school counselor. *School Counselor, 22*, 236-242.

Ellis, A. (1998). Rational emotive behavior therapy and its applications to emotional education. In A. Ellis & S. Blau (Eds.), *The Albert Ellis Reader: A guide to well-being using rational emotive behavior therapy* (pp. 253-260). New Jersey: Citadel Press.

Emler, N. (2001). *Self-esteem: The costs and causes of low self-esteem*. York, UK: York Publishing Services for the Joseph Rowntree Foundation.

Erikson, E. H. (1968). *Identity, youth, and crisis*. New York: W. W. Norton.

Eysenck, H. J. (1991). Dimensions of personality: 16, 5, or 3? Criteria for a taxonomic paradigm. *Personality and Individual Differences, 12,* 773-790.

Faul, F., & Erdfelder, E. (1992). *GPOWER: A priori, post-hoc, and compromise power analyses for MS-DOS* [Computer programme]. Department of Psychology, Bonn University, Bonn, FRG. Software available at http://www.psycho.uni-duesseldorf.de/aap/projects/gpower/ [accessed 16th March 2011].

Field, A. (2009). *Discovering statistics using SPSS.* London: Sage Publications Ltd.

Feingold, A. (1988). Cognitive gender differences are disappearing. *American Psychologist, 43*, 95-103.

Feinstein, L. (2000). *The relative economic importance of academic, psychological and behavioural attributes developed in childhood*. Unpublished paper, Centre for Economic Performance, London School of Economics.

Fennena, E., & Sherman, J. A. (1978). Sex-related differences in mathematics achievement and related behaviours: A further study. *Journal for Research in Mathematics Education, 9*, 189-203.

Ferla, J., Valcke, M., & Cai, Y. (2009). Academic self-efficacy and academic self-concept: Reconsidering structural relationships. *Learning and Individual Differences, 19*(4), 499-505.

Fernandez-Ballesteros, R. (2004). Self-report questionnaires. In S. N. Haynes & E. M. Heiby (Eds.), *Comprehensive handbook of psychological assessment, Vol. 3: Behavioural assessment* (pp. 194-221). Hoboken, New Jersey: John Wiley and Sons.

Ferren, P. M. (1999). Comparing perceived self-efficacy among adolescent Bosnian and Croatian refugees with and without posttraumatic stress disorder. *Journal of Traumatic Stress, 12*, 405-420.

Forsyth, D. R., Lawrence, N. K., Burnette, J. L., & Baumeister, R. F. (2007). Attempting to improve the academic performance of struggling college students by bolstering their self-esteem: An intervention that backfired. *Journal of Social and Clinical Psychology, 26*(4), 447-459.

Fox, K. R. (2000). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology, 31*, 228-240.

Friedrich, T. L., Byrne, C. L., & Mumford, M. D. (2009). Methodological and theoretical considerations in survey research. *The Leadership Quarterly, 20*, 57-60.

Garson, D. G. (2009). *Multivariate GLM, MANOVA, and MANCOVA*. *Statnotes: Topics in multivariate analysis*. Available at http://faculty.chass.ncsu.edu/garson/PA765/ statnote.htm.

Gibb, B. E., Zhu, L., Alloy, L. B., & Abramson, L. Y. (2002). Attributional styles and academic achievement in university students: A longitudinal investigation. *Cognitive Therapy and Research, 26*(3), 309-315.

Goetz, T., Cronjaeger, H., Frenzel, A. C., Ludtke, O., & Hall, N. C. (2010). Academic self-concept and emotion relations: Domain specificity and age effects. *Contemporary Educational Psychology, 35*, 44-58.

Goodman, A., & Gregg, P. (Eds.) (2010). *Poorer children's educational attainment: How important are attitudes and behaviours?* Joseph Rowntree Foundation. Available at http://www.jrf.org.uk/sites/files/jrf/poorer-children-education-full.pdf [accessed 23rd March 2011].

Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations. *Journal of Counseling Psychology, 28*, 545-579.

Gottfried, A. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82*, 525-538.

Graham, S. (1984). Communicating sympathy and anger to Black and White students: The cognitive (attributional consequences) of affective cues. *Journal of Personality and Social Psychology, 47*(1), 40-54.

Graham, S., & Weiner, B. (1996). Theories and principles of motivation. In C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 63-84). New York: Macmillan.

Green, J., Nelson, G., Martin, A. J., & Marsh, H. W. (2006). The causal ordering of self-concept and academic motivation and its effect on academic achievement. *International Education Journal, 7*(4), 534-546.

Green, L., & Foster, D. (1986). Classroom intrinsic motivation: Effects of scholastic level, teacher orientation, and gender. *The Journal of Educational Research, 80*(1), 34-39.

Groholt, B., Ekeberg, O., Wichstrom, L., & Haldorsen, T. (2005). Suicidal and non-suicidal adolescents: Different factors contribute to self-esteem. *Suicide and Life-Threatening Behaviour, 35*, 525-535.

Grozdek, M., Jagodic, G. K., & Zarevski, P. (2007). Self-concept among high-school students of different academic achievement. *Suvremena Psihologija, 10*, 47-54.

Guay, F., Marsh, H. W., & Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology, 95*(1), 124-136.

Hackett, G. (1995). Self-efficacy in career choice and development. In A. Bandura (Ed.), *Self-Efficacy in Changing Societies* (pp. 232-258). New York: Cambridge University Press.

Hajzler, D. J., & Bernard, M. E. (1991). A review of Rational-Emotive Education outcome studies. *School Psychology Quarterly, 6*(1), 27-49.

Haney, P., & Durlak, J. A. (1998). Changing self-esteem in children and adolescents: A meta-analytic review. *Journal of Clinical Child Psychology, 27*(4), 423-433.

Hansford, B. C., & Hattie, J. A. (1982). The relationship between self and achievement/ performance measures. *Review of Educational Research, 52*(1), 123-142.

Hardy, J., Hall, C. R., & Hardy, L. (2005). Quantifying athlete self-talk. *Journal of Sport Sciences, 23*(9), 905-917.

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental model. *Human Development, 1*, 34-64.

Harter, S. (1980). *A Scale of Intrinsic versus Extrinsic Orientation in the Classroom*. Denver, Colorado: University of Denver.

Harter, S. (1981). A new self-report scale of Intrinsic versus Extrinsic Orientation in the Classroom: Motivational and informational components. *Developmental Psychology, 17*(3), 300-312.

Harter, S. (1982). The perceived competence scale for children. *Child Development, 53*, 87-97.

Harter, S. (1983). The development of the self system. In M. Hetherington (Ed.), *Handbook of child psychology, Vol. 4: Social and personality development* (pp. 275-385). New York: Wiley.

Harter, S. (1985a). Competence as a dimension of self-evaluation: Toward a comprehensive model of self-worth. In R. L. Leahy (Ed.), *The development of the self* (pp. 55-122). Orlando, FL: Academic Press.

Harter, S. (1985b). *Manual for the Self-Perception Profile for Children*. Denver, US: University of Denver.

Harter, S. (1986). Processes underlying the formation, maintenance, and enhancement of the self-concept. In J. Suls & A. Greenwald (Eds.), *Psychological perspectives on the self* (Vol. 3, pp. 137-181). Hillsdale, NJ: Erlbaum.

Harter, S. (1988). *Manual for the Self-Perception Profile for Adolescents*. Denver, USA: University of Denver.

Harter, S. (1990a). Causes, correlates and the functional role of global self worth: A life-span perspective. In J. Kolligan & R. Sternberg (Eds.), *Perceptions of competence and incompetence across the life-span* (pp. 67-100). Yale: Yale University Press.

Harter, S. (1990b). Processes underlying adolescent self-concept formation. In R. Montemayor, G. R. Adams & T. P. Gullotta (Eds.), *From childhood to adolescence: A transition period?* (pp. 205-239). Newbury Park, CA: Sage.

Harter, S. (1990c). Issues in the assessment of the self-concept of children and adolescents. In A. M. LaGreca (Ed.), *Through the eyes of the child: Obtaining self-reports from children and adolescents* (pp. 292-325). Boston: Allyn and Bacon.

Harter, S. (1993). Causes and consequences of low self-esteem in children and adolescents. In R. F. Baumeister (Ed.), *Self-esteem: The puzzle of low self-regard* (pp. 87-116). New York: Plenum press.

Harter, S. (1998). The development of self-representations. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (5th ed., pp. 553-617). New York: Wiley.

Harter, S. (1999). *The construction of the self: A developmental perspective*. Guilford: Guilford Press.

Harter, S., & Mayberry, W. (1984). *Self-worth as a function of the discrepancy between one's aspirations and one's perceived self-competence: William James revisited*. Denver, CO: University of Denver Press.

Harter, S., & Pike, R. (1983). *The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children [procedural manual]*. Denver, CO: University of Denver.

Hattie, J. (1992). *Self-concept*. Hillsdale, NJ: Erlbaum.

Hatzigeorgiadis, A., Theodorakis, Y., & Zourbanos, N. (2004). Self-talk in the swimming pool: The effects of self-talk on thought content and performance on water polo tasks. *Journal of Applied Sport Psychology, 16*, 138-150.

Heitjan, D. F. (1997). What can be done about missing data? Approaches to imputation. *American Journal of Public Health, 87*, 548-550.

Helmke, A. (1989). Mediating processes between children's self-concept of ability and mathematical achievement: A longitudinal study. In H. Mandel, E. DeCorte, N. Bennett & H. F. Friedrich (Eds.), *Learning and instruction* (pp. 537-549). Oxford: Pergamon Press.

Helmke, A., & van Aken, M. A. G. (1995). The causal ordering of academic achievement and self-concept of ability during elementary school: A longitudinal study. *Journal of Educational Psychology, 87*, 624-637.

Hoge, D., Smit, E., & Crist, J. (1995). Reciprocal effects of self-concept and academic achievement in sixth and seventh grade. *Journal of Youth and Adolescence, 24*, 295-314.

Hutchison, D. & Styles, B. (2010). *A guide to running randomised controlled trials for educational researchers*. Slough: NFER.

James, W. (1890/1963). *The principles of psychology*. Cambridge, MA: Harvard University Press (Original work published in 1890 by Holt, Rinehart and Winston).

Jaycox, L. J., Reivich, K. J., Gillham, J., & Seligman, M. E. P. (1994). Prevention of depressive symptoms in school children. *Behaviour Research and Therapy, 32*(8), 801-816.

Jerslid, A. T. (1965). Social and original origins of the self. In D. E. Hamachek (Ed.), *The self in growth, teaching and learning* (pp. 196-208). Englewood Cliffs, NJ: Prentice-Hall.

Johnson, M. (2000). Go For It! – The Thistley Hough High School Personal Development Program. *The Letter: The Pacific Institute, 3*(3), 1-10. Available at http://www.thepacific institute.us/v2/files/pdfs/00-03.pdf [accessed 23rd March 2011].

Judge, T. A. (2009). Core self-evaluations and work success. *Current Directions in Psychological Science, 18*(1), 58-62.

Judge, T. A., Erez, A., Bono, J. E., & Thoreson, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology, 83*, 693-710.

Judge, T. A., Erez, A., Bono, J. E., & Thoreson, C. J. (2003). The Core Self-Evaluations Scale: Development of a measure. *Personnel Psychology, 56*, 303-331.

Judge, T. A., Locke, E. A., Durham, C. C., & Kluger, A. N. (1998). Dispositional effects on job and life satisfaction: The role of core evaluations. *Journal of Applied Psychology, 83*, 17-34.

Kahne, J. (1996). The politics of self-esteem. *American Educational Research Journal, 33*, 3-22.

Kaiser, H. (1958). The varimax criterion or analytic rotation in factor analysis. *Psychmetrika, 23*, 187-200.

Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika, 39*, 31-36.

Katz, L. G. (1993). All about me: Are we developing our children's self-esteem or their narcissism? *American Educator, 17*(2), 18-23.

Kay, R., & Felker, D. W. (1975). *Level of aspiration: A behavioral expression of self-concept.* Paper presented at the American Education Research Association, Washington, DC.

Keef, S. P., & Roush, M. L. (1997). New Zealand evidence on the performance of accounting students: Race, gender, and self-concept. *Issues in Accounting Education, 12*(2), 315-330.

Kling, K. C., Hyde, J. S., Showers, C. J., & Buswell, B. N. (1999). Gender differences in self-esteem: A meta-analysis. *Psychological Bulletin, 125*(4), 470-500.

Knowles, J. (1997). *The influence of socio-economic status on aspirations to enter higher education: School pupils' awareness, understanding and expectations of higher education.* Paper presented at the British Educational Research Association Annual Conference, University of York.

Kobal, D., & Musek, J. (2001). Self-concept and academic achievement: Slovenia and France. *Personality and Individual Differences, 30*(5), 887-899.

Kohn, A. (1994). The truth about self-esteem. *Phi Delta Kappan, 76*(4), 272-283.

Kuder, G. F., & Richardson, M. W. (1937). The theory of the estimation of test reliability. *Psychometrika, 2*, 151-160.

Lane, J., Lane, A. M., & Kyprianou, A. (2004). Self-efficacy, self-esteem and their impact on academic performance. *Social Behavior and Personality, 32*(3), 247-256.

Lau, I. C., Yeung, A. S., Jin, P., & Low, R. (1999). Toward a hierarchical, multidimensional English self-concept. *Journal of Educational Psychology, 91*(4), 747-755.

Lent, R. W., Brown, S. D., & Gore, P. A., Jr. (1997). Discriminant and descriptive validity of academic self-concept, academic self-efficacy, and mathematics-specific self-efficacy. *Journal of Counseling Psychology, 44*, 307-315.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*, 79-122.

Lent, R. W., Brown, S. D., & Hackett, G. (1996). Career development from a social cognitive perspective. In D. Brown & L. Brooks (Eds.), *Career choice and development* (3rd ed., pp. 373-421). San Francisco: Jossey-Bass.

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97*(2), 184-196.

Levene, H. (1960). Robust tests for equality of variances. In I. Olkin, S. G. Ghurye, W. Hoeffding, W. G. Madow & H. B. Mann (Eds.), *Contributions to probability and statistics. Essays in honor of Harold Hotelling* (pp. 278-292). Stanford, CA: Stanford University Press.

Licht, B. G. (1983). Cognitive-motivational factors that contribute to the achievement of learning-disabled children. *Journal of Learning Disabilities, 16*, 483-490.

Linnenbrink, E. A., & Pintrich, P. R. (2002a). Achievement goal theory and affect: An asymmetrical bidirectional model. *Educational Psychologist, 37*, 69-78.

Linnenbrink, E. A., & Pintrich, P. R. (2002b). Motivation as an enabler for academic success. *School Psychology Review, 31*(3), 313-327.

Litsky, B., & Greenhaus, J. (2007). The relationship between gender and aspirations to senior management. *Career Development International, 12*(7), 637-659.

Lyden, J. A., Chaney, L. H., & Danehower, V. C. (2002). Anchoring, attributions, and self-efficacy: An examination of interactions. *Contemporary Educational Psychology, 27*, 99-117.

Looker, E. D., & Pineo, P. C. (1983). Social psychological variables and their relevance to the status attainment of teenagers. *American Journal of Sociology, 88*, 1195-1219.

Ma, X., & Kishor, N. (1997). Attitudes towards self, social factors, and achievement in mathematics: A meta-analytic review. *Educational Psychology Review, 9*(2), 89-120.

Mac Ivor, D., Stipek, D., & Daniels, D. (1991). Explaining within semester changes in student effort in junior high and senior high school courses. *Journal of Educational Psychology, 83*, 201-211.

Maclellan, E. (2005). Should we raise pupils' self-esteem? *Education, 33*(1), 7-12.

Maehr, M. L., & Midgley, C. (1996). Enhancing student motivation: A schoolwide approach. *Educational Psychologist, 26*, 399-427.

Mamassis, G., & Doganis, G. (2004). The effects of a mental training program on junior's pre-competitive anxiety, self-confidence, and tennis performance. *Journal of Applied Sport Psychology, 16*, 118-137.

Manderlink, G., & Harackiewicz, J. M. (1984). Proximal versus distal goal setting and intrinsic motivation. *Journal of Personality and Social Psychology, 47*(4), 918-928.

Marjoribanks, K. (1995). Factors affecting the learning environments and school-related outcomes of Australian adolescents. *The Journal of Social Psychology, 135*(1), 89-95.

Marjoribanks, K. (1996). Family learning environments and students' outcomes: A review. *Journal of Comparative Family Studies, 27*(2), 373-394.

Marsh, H. W. (1986). Verbal and math self-concepts: An internal/external frame of reference model. *American Educational Research Journal, 23*, 129-149.

Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology, 79*, 280-295.

Marsh, H. W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to adulthood. *Journal of Educational Psychology, 81*(3), 417-430.

Marsh, H. W. (1990a). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology, 82*, 623-636.

Marsh, H. W. (1990b). A multidimensional, hierarchical model of self-concept: Theoretical and empirical justification. *Educational Psychology Review, 2*(2), 77-172.

Marsh, H. W. (1990c). Causal ordering of academic self-concept and academic achievement: A multiwave, longitudinal path analysis. *Journal of Educational Psychology, 82*(4), 646-656.

Marsh, H. W. (1992a). *Self Description Questionnaire (SDQ) I: A theoretical and empirical basis for the measurement of multiple dimensions of preadolescent self-concept. An interim test manual and a research monograph*. Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992b). *Self Description Questionnaire (SDQ) II: A theoretical and empirical basis for the measurement of multiple dimensions of adolescent self-concept. An interim test manual and research monograph*. Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992c). *Self Description Questionnaire (SDQ) III: A theoretical and empirical basis for the measurement of multiple dimensions of late adolescent self-concept. An interim test manual and research monograph*. Macarthur, New South Wales, Australia: University of Western Sydney, Faculty of Education.

Marsh, H. W. (1992d). Content specificity of relations between academic achievement and academic self-concept. *Journal of Educational Psychology, 84*, 35-42.

Marsh, H. W. (1993). Academic self-concept: Theory, measurement, and research. In J. Suls (Ed.), *Psychological perspectives on the self* (Vol. 4, pp. 59-98). Hillsdale NJ: Lawrence Erlbaum.

Marsh, H. W. (2006). *Self-concept theory, measurement and research into practice: The role of self-concept in educational psychology*. Great Britain: British Psychological Society (25th Vernon-Wall Lecture presented to the Annual Meeting of the Education Section of the British Psychological Society).

Marsh, H. W., and Ayotte, V. (2003). Do multiple dimensions of self-concept become more differentiated with age? The differential distinctiveness hypothesis. *Journal of Educational Psychology, 95*, 687-706.

Marsh, H. W., Byrne, B. M., & Shavelson, R. J. (1988). A multifaceted academic self-concept: Its hierarchical structure and its relation to academic achievement. *Journal of Educational Psychology, 80*, 366-380.

Marsh, H. W., Byrne, B. M., & Shavelson, R. J. (1992). A multidimensional, hierarchical self-concept. In T. M. Brinthaupt & R. P. Lipka (Eds.), *The self: Definitional and methodological issues* (pp. 44-95). New York: State University of New York Press.

Marsh, H. W., Byrne, B. M., & Yeung, A. S. (1999). Causal ordering of academic self-concept and achievement: Reanalysis of a pioneering study and revised recommendations. *Educational Psychologist, 34*(3), 155-168.

Marsh, H. W., & Craven, R. G. (2006). Reciprocal effects of self-concept and performance from a multidimensional perspective: Beyond seductive pleasure and unidimensional perspectives. *Perspectives on Psychological Science, 1*(2), 133-163.

Marsh, H. W., Craven, R. G., & Debus, R. (1991). Self-concepts of young children 5 to 8 years of age: Measurement and multidimensional structure. *Journal of Educational Psychology, 83*, 377-392.

Marsh, H. W., & Hau, K. T. (2003). Big-fish-little-pond effect on academic self-concept: A cross-cultural (26-country) test of the negative effects of academically selective schools. *American Psychologist, 58*(5), 364-376.

Marsh, H. W., Hau, K. T., & Kong, C. K. (2002). Multilevel causal ordering of academic self-concept and achievement: Influence of language instruction (English compared with Chinese) for Hong Kong students. *American Research Journal, 39*(3), 727-763.

Marsh, H. W., & Holmes, I. W. M. (1990). Multidimensional self-concepts: Construct validation of responses by children. *American Educational Research Journal, 27*, 89-117.

Marsh, H. W., & O'Mara, A. J. (2008). Reciprocal effects between academic self-concept, self-esteem, achievement and attainment over seven adolescent-adult years: Unidimensional and multidimensional perspectives of self-concept. *Personality and Social Psychology Bulletin, 34*(4), 542-552.

Marsh, H. W., & Richards, G. (1988). The Outward Bound Bridging Course for low achieving high school males: Effect on academic achievement and multidimensional self-concepts. *Australian Journal of Psychology, 40*, 281-298.

Marsh, H. W., & Shavelson, R. (1985). Self-concept: Its multifaceted, hierarchical structure. *Educational Psychologist, 20*, 107-125.

Marsh, H. W., Trautwein, U., Ludtke, O., Koller, O., & Baumert, J. (2005). Academic self-concept, interest, grades and standardised test scores: Reciprocal effects model of causal ordering. *Child Development, 76*(2), 397-416.

Marsh, H. W., Trautwein, U., Ludtke, O., Koller, O., & Baumert, J. (2006). Integration of multidimensional self-concept and core personality constructs: Construct validation and relations to well-being and achievement. *Journal of Personality, 74*(2), 403-456.

Marsh, H. W., Walker, R., & Debus, R. L. (1991). Subject-specific components of academic self-concept and self-efficacy. *Contemporary Educational Psychology, 16*, 331-345.

Marsh, H. W., & Yeung, A. S. (1997a). Causal effects of academic self-concept on academic achievement: Structural equation models of longitudinal data. *Journal of Educational Psychology, 89*, 41-54.

Marsh, H. W., & Yeung, A. S. (1997b). Coursework selection: Relations to academic self-concept and achievement. *American Education Research Journal, 34*, 691-720.

Marsh, H. W., & Yeung, A. S. (1998). Top-down, bottom-up, and horizontal models: The direction of causality in multidimensional, hierarchical self-concept models. *Journal of Personality and Social Psychology, 75*, 509-527.

Martin, A. J. (2008). Enhancing student motivation and engagement: The effects of a multidimensional intervention. *Contemporary Educational Psychology, 33*(2), 239-269.

Martin, D., & McInerney, D. M. (1998, April 13-17). *Age, gender, cultural, and socioeconomic differences in students' academic motivation, cognition, and achievement.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

Maruyama, G., Rubin, R. A., & Kingsbury, G. G. (1981). Self-esteem and educational achievement: Independent constructs with a common cause? *Journal of Personality and Social Psychology, 40*, 962-975.

Mauchly, J. W. (1940). Significance test for sphericity of a normal n-variate distribution. *The Annals of Mathematical Statistics, 11*(2), 204-209.

Maxwell, S. E., & Delaney, H. E. (2004). *Designing experiments and analyzing data: A model comparison perspective* (2nd ed.). London: Lawrence Erlbaum.

McNeal, R. B., Jr. (2001). Differential effects of parental involvement on cognitive and behavioural outcomes by socioeconomic status. *Journal of Socio-Economics, 30*(4), 171-179.

Mecca, A. M., Smelser, M. J., & Vasconcellos, J. (1989). *The social importance of self-esteem.* Berkeley, CA: University of California.

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its consequences for young adolescents' course enrollment intentions and performances in mathematics. *Journal of Educational Psychology, 82*, 60-70.

Messer, B., & Harter, S. (1986). *Manual for the Adult Self-Perception Profile*. Denver, CO: Univeristy of Denver.

Midgley, S. (2008). *Raising achievement, behaviour, self-esteem, and inclusion: How behaviour and self-esteem strategies and structure affect achievement and inclusion.* Available from www.simonmidgley.co.uk/achieving/inclusion.htm [accessed 25th January 2011].

Miller, J. W., Coombs, W. T., & Fuqua, D. R. (1999). An examination of psychometric properties of Bandura's Multidimensional Scales of Perceived Self-Efficacy. *Measurement and Evaluation in Counseling and Development, 31*(4), 186-196.

Mone, M. A., Baker, D. B., & Jeffries, F. (1995). Predictive validity and time dependency of self-efficacy, self-esteem, personal goals, and academic performance. *Educational and Psychological Measurement, 55*(5), 716-727.

Mruk, C. J. (2006). *Self-esteem research, theory, and practice: Toward a positive psychology of self-esteem* (3rd ed.). New York: Springer Publishing.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38*(1), 30-38.

Mushinski-Fulk, B. J., & Mastropieri, M. A. (1990). Training positive attitudes: "I tried hard and did well". *Intervention in School and Clinic, 26*, 79-83.

Myers, R. (1990). *Classical and modern regression with applications* (2nd ed.). Boston, MA: Duxbury.

Neemann, J., & Harter, S. (1986). *Manual for the Self-Perception Profile for College Students*. Denver, CO: University of Denver.

Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., & Bent, D. (1975). *SPSS: Statistical package for the social sciences* (2nd ed.). New York: McGraw-Hill.

Nevid, J. S., & Rathus, S. A. (2007). *Psychology and the challenges of life: Adjustment in the new millennium* (Vol. 10). USA: Wiley.

Newman, R. S. (1984). Achievement and self-evaluations in mathematics. *Journal of Educational Psychology, 76*, 857-873.

Nicholls, J. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328-346.

Nichols, A., & Schaffer, M. (2007, July). *Clustered errors in STATA*. Paper presented at the STATA Users' Group Meetings, United Kingdom. Available at http://www.docstoc.com /docs/12699953/Clustered-Errors-in-Stata [accessed 16th March 2011].

Norwich, B. (1987). Self-efficacy and mathematics achievement: A study of their relation. *Journal of Educational Psychology, 79*, 384-387.

Nunnally, J. C. (1978). *Psychometric theory*. New York: McGraw-Hill.

OFSTED (The Office of Standards in Education, 1993). *Achieving good behaviour in school: A report from the Office of Her Majesty's Chief Inspector of Schools*. London: HMSO.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instrumentation and Computers, 32*, 396-402. Syntax available at http://people.ok.ubc.ca/brioconn/nfactors /nfactors.html.

O'Mara, A. J., Marsh, H. W., Craven, R. G., & Debus, R. L. (2006). Do self-concept interventions make a difference? A synergistic blend of construct validation and meta-analysis. *Educational Psychologist, 41*(3), 181-206.

Orr, E., & Dinur, B. (1995). Social setting effects on gender differences in self-esteem: Kibbutz and urban adolescents. *Journal of Youth and Adolescence, 24*(1), 3-27.

Orth, U., Trzesniewski, K. H., & Robins, R. W. (2010). Self-esteem development from young adulthood to old age: A cohort-sequential longitudinal study. *Journal of Personality and Social Psychology, 98*(4), 645-658.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543-578.

Pajares, F. (1997). Current directions in self-efficacy research. In M. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 1-49). Greenwich, CT: JAI Press.

Pajares, F., Britner, S. L., & Valiante, G. (2000). Relation between achievement goals and self-beliefs of middle school students in writing and science. *Contemporary Educational Psychology, 25*(4), 406-422.

Pajares, F., & Graham, L. (1999). Self-efficacy, motivation constructs, and mathematics performance of entering middle school students. *Contemporary Educational Psychology, 24*(2), 124-139.

Pajares, F., & Johnson, M. J. (1994). Confidence and competence in writing: The role of self-efficacy, outcome expectancy, and apprehension. *Research in the Teaching of English, 28*(3), 313-331.

Pajares, F., & Kranzler, J. (1994). Confidence and competence in mathematics: The role of self-efficacy, self-concept, and general mental ability. *Florida Educational Research Council Research Bulletin, 26*, 8-32.

Pajares, F., & Kranzler, J. (1995). Self-efficacy beliefs and general mental-ability in mathematical problem-solving. *Contemporary Educational Psychology, 20*(4), 426-443.

Pajares, F., & Miller, M. D. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem-solving: A path-analysis. *Journal of Educational Psychology, 86*(2), 193-203.

Pajares, F., & Miller, M. D. (1995). Mathematics self-efficacy and mathematics performances: The need for specificity of assessment. *Journal of Counseling Psychology, 42*, 190-198.

Pajares, F., Miller, M. D., & Johnson, M. J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology, 91*(1), 50-61.

Pajares, F., & Schunk, D. H. (2001). Self-beliefs and school success: Self-efficacy, self-concept, and school achievement. In R. J. Riding & S. G. Raynor (Eds.), *International perspectives on individual differences, Vol. 2: Self-perception* (pp. 239-266). London: Ablex Publishing.

Pajares, F., & Schunk, D. H. (2002). Self and self-belief in psychology and education: A historical perspective. In J. Aronson (Ed.), *Improving academic achievement: Impact of psychological factors on education* (pp. 3–21). London, England: Academic.

Pajares, F., & Valiante, G. (1999). Grade level and gender differences in the writing self-beliefs of middle school students. *Contemporary Educational Psychology, 24*(4), 390-405.

Pajares, F., & Valiante, G. (2002). Students' self-efficacy in their self-regulated learning strategies: A developmental perspective. *Psychologica, 45*(4), 211-221.

Perry, R. P., Hechter, F. J., Menec, V. H., & Weinberg, L. E. (1993). Enhancing achievement motivation and performance in college students: An attributional retraining perspective. *Research in Higher Education, 34*(6), 687-723.

Pallant, J. (2007). *SPSS survival manual: A step-by-step guide to data analysis* (3rd ed.). UK: Open University Press.

Pastorelli, C., Caprara, G. V., Barbaranelli, C., Rola, J., Rozsa, S., & Bandura, A. (2001). The structure of children's perceived self-efficacy: A cross-national study. *European Journal of Psychological Assessment, 17*(2), 87-97.

Paulhus, D. L. (1991). Measurement control of response bias. In J. P. Robinson, P. R. Shaver & L. S. Wrightsman (Eds.), *Measures of social psychological attitudes, Vol. 1: Measures of personality and social psychological attitudes* (pp. 17-59). San Diego: Academic Press.

Pelham, B. W., & Swann, W. B. (1989). From conceptions to self-worth: On the sources and structure of global self-esteem. *Journal of Personality and Social Psychology, 57*, 672-680.

Phan, H. P. (2007). Examination of student learning approaches, reflective thinking, and self-efficacy beliefs at the University of the South Pacific: A path analysis. *Educational Psychology, 27*(6), 789–806.

Phan, H. P. (2009). Relations between goals, self-efficacy, critical thinking and deep processing strategies: A path analysis. *Educational Psychology, 29*(7), 777-799.

Pierce, C. A., Block, R. A., & Aguinis, H. (2004). Cautionary note on reporting eta-squared values from multifactor ANOVA designs. *Educational and Psychological Measurement, 64*(6), 916-924.

Pietsch, J. (1999). *Self-efficacy, self-concept and academic achievement: An empirical comparison of self-efficacy and self-concept, and the relative predictive utility of these self-perceptions within academic contexts.* Unpublished Masters thesis, University of Sydney, Sydney, New South Wales, Australia.

Pietsch, J., Walker, R., & Chapman, E. (2003). The relationship among self-concept, self-efficacy, and performance in mathematics during secondary school. *Journal of Educational Psychology, 95*(3), 589-603.

Pindyck, R. S., & Rubinfeld, D. L. (1998). *Econometric models and economic forecasts* (4th ed.). Boston: McGraw Hill.

Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology, 82*, 33-40.

Pintrich, P. R., & Schunk, D. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.). Upper Saddle, NJ: Prentice-Hall, Inc.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903.

Pottebaum, S. M., Keith, T. Z., & Ehly, S. W. (1986). Is there a causal relation between self-concept and academic achievement? *Journal of Educational Psychology, 79*, 140-144.

Proudfoot, J., Gorvett, G., Noble, M., & Reeves, B. (2001). *Evaluation of 'Breakthrough to Excellence': A programme for disengaged youth.* Unpublished paper, Centre for Economic Performance, London School of Economics.

Prager, K. J., & Freeman, A. (1979). Self-esteem, academic competence, educational aspiration, and curriculum choice of urban community college students. *Journal of College Student Personnel, 20*(5), 392-397.

Rayner, S. G., & Deci, U. (2001). Self-esteem and self-perceptions in the classroom: Valuable circle time? In R. J. Riding & S. G. Rayner (Eds.), *International perspectives on individual differences, Vol. 2: Self-perception* (pp. 171-208). Westport, CO: Ablex.

Reasoner, R. W. (1992). You can bring hope to failing students. What's behind self-esteem programs: Truth or trickery? *School Administrator, 49*(4), 23-24, 26, 30.

Renick, M. J., & Harter, S. (1988). *Manual for the Self-Perception Profile for Learning Disabled Students*. Denver, CO: University of Denver.

Rinn, A. N., Plucker, J. A., & Stocking, V. B. (2010). Fostering gifted students' affective development: A look at the impact of academic self-concept. *Teaching Exceptional Children Plus, 6*(4), Article 1. Available at http://escholarship.bc.edu/education/ tecplus/vol6/iss4/art1/

Robins, R. W., & Trzesniewski, K. H. (2005). Self-esteem development across the lifespan. *Current Directions in Psychological Science, 14*(3), 158-162.

Robinson, W. P., Taylor, C. A., & Piolat, M. (1990). School attainment, self-esteem, and identity: France and England. *European Journal of Social Psychology, 20*(5), 387-403.

Rojewski, J. W., & Yang, B. (1997). Longitudinal analysis of select influences on adolescents' occupational aspirations. *Journal of Vocational Behavior, 51*, 375-410.

Roman, S., Cuestas, P. J., & Fenollar, P. (2008). An examination of the interrelationships between self-esteem, others' expectations, family support, learning approaches and academic achievement. *Studies in Higher Education, 33*(2), 127-138.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton NJ: Princeton University Press.

Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.

Rosenberg, M. (1985). Self-concept of psychological well-being. In R. Leahy (Ed.), *The development of the self* (pp. 205-246). Orlando: Academic Press.

Rosenberg, M., Schooler, C., & Schoenbach, C. (1989). Self-esteem and adolescent problems: Modeling reciprocal effects. *American Sociological Review, 54*, 1004-1018.

Ross, C. E., & Broh, B. A. (2000). The roles of self-esteem and the sense of personal control in the academic achievement process. *Sociological Education, 73*(4), 270-284.

Roth, P. L. (1994). Missing data: A conceptual review for applied psychologists. *Personnel Psychology, 47*, 537-560.

Roth, P. L., & Switzer, F. S., III. (1999). Missing Data: Instrument-level heffalumps and item-level woozles. *Academy of Management, Research Methods Division: Research Methods Forum, Vol. 4.* Available at http://division.aomonline.org/rm/1999_RMD_Forum_missing_Data.htm.

Roth, P. L., Switzer, F. S., III, & Switzer, D. (1999). Missing data in multi-item scales: A Monte Carlo Analysis of missing data techniques. *Organizational Research Methods, 2*, 211-232.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control reinforcement. *Psychological Monographs, 80*, 1-28.

Rubin, R., Dorle, J., & Sandidge, S. (1976). *The Coopersmith Self-Esteem Inventory related to academic achievement and school behaviour*. Interim Research Report No. 23, US Department of Health, Education, and Welfare, National Institute of Education. Minneapolis: University of Minnesota.

Rubin, R. A., Dorle, J., & Sandidge, S. (1977). Self-esteem and school performance. *Psychology in the Schools, 14*, 503-507.

Rudasill, K. M., & Callahan, C. M. (2008). Psychometric characteristics of the Harter Self-Perception Profiles for Adolescents and Children for use with gifted populations. *Gifted Child Quarterly, 52*, 70-86.

Rule, D. L., & Griesemer, B. A. (1996). *Relationships between Harter's Scale of Intrinsic versus Extrinsic Orientation and Bandura's Scale of Self-Efficacy for Self-Regulated Learning.* Paper presented at the Annual meeting of the Eastern Educational Research Association, Cambridge, MD.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67.

Ryan, R. M., & Stiller, J. (1991). The social contexts of internalisation: Parent and teacher influences on autonomy, motivation, and learning. In P. R. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement* (Vol. 7, pp. 115-149). Greenwich, CT: JAI Press.

Saigh, P. A., Mroueh, M., Zimmerman, B. J., & Fairbank, J. A. (1995). Self-efficacy expectations among traumatized adolescents. *Behavior Research and Therapy, 33*(6), 701-704.

Salomon, G. (1984). Television is 'easy' and print is 'tough': The differential impact of mental effort in learning as a function of perceptions and attributions. *Journal of Educational Psychology, 76*, 647-658.

Sansone, C. & Harackiewicz, J. M. (2000). *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. London, UK: Academic Press.

Schafer, J. L. (1997). *Analysis of incomplete multivariate data*. Boca Raton, FL: Chapman and Hall/CRC.

Scheirer, M. A., & Kraut, R. E. (1979). Increasing educational achievement via self-concept change. *Review of Educational Research, 49*, 131-150.

Schimel, J., Arndt, J., Banko, K. M., & Cook, A. (2004). Not all self-affirmations were created equal: The cognitive and social benefits of affirming the intrinsic (vs. extrinsic) self. *Social Cognition, 22*(1), 75-99.

Schmidt, J. A., & Padilla, B. (2003). Self-esteem and family challenge: An investigation of their effects on achievement. *Journal of Youth and Adolescence, 32*(1), 37-46.

Schoon, I. (2003). Teenage aspirations for education and work and long-term outcomes. Evidence from two British Cohort Studies. *ESRC funded seminar series: How to motivate (demotivated) 16-year olds?* London School of Economics, Centre for Economic Performance.

Schunk, D. H. (1981). Modelling and attribution feedback effects on children's achievement: A self-efficacy analysis. *Journal of Educational Psychology, 74*, 93-105.

Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology, 74*, 548-556.

Schunk, D. H. (1983a). Developing children's self-efficacy and skills: The roles of social comparative information and goal setting. *Contemporary Educational Psychology, 8*, 76-86.

Schunk, D. H. (1983b). Ability versus effort attributional feedback: Differential effects on self-efficacy and achievement. *Journal of Educational Psychology, 75*, 848-856.

Schunk, D. H. (1983c). Reward contingencies and the development of children's skills and self-efficacy. *Journal of Educational Psychology, 75*(4), 511-518.

Schunk, D. H. (1984a). Enhancing self-efficacy and achievement through rewards and goals: Motivational and informational effects. *Journal of Educational Research, 78*, 29-34.

Schunk, D. H. (1984b). Sequential attributional feedback and children's achievement behaviors. *Journal of Educational Psychology, 76*, 1159-1169.

Schunk, D. H. (1985). Self-efficacy and classroom learning. *Psychology in the schools, 22*, 208-223.

Schunk, D. H. (1987). Peer models and children's behavioral change. *Review of Educational Research, 57*, 149-174.

Schunk, D. H. (1991). Self-efficacy and academic motivation. *Educational Psychologist, 26*, 207-231.

Schunk, D. H. (1995). Self-efficacy and education and instruction. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application* (pp. 281-303). New York: Plenum Press.

Schunk, D. H., & Ertmer, P. A. (1999). Self-regulatory processes during computer skill acquisition: Goal and self-evaluative influences. *Journal of Educational Psychology, 91*, 251-260.

Schunk, D. H., & Gunn, T. P. (1986). Self-efficacy and skill development: influence of task strategies and attribution. *Journal of Educational Psychology, 79*, 238-244.

Schunk, D. H., & Hanson, A. R. (1985). Peer models: Influence on children's self-efficacy and achievement. *Journal of Educational Psychology, 77*, 313-322.

Schunk, D. H., & Hanson, A. R. (1989). Self-modeling and children's cognitive skill learning. *Journal of Educational Psychology, 81*, 155-163.

Schunk, D. H., Hanson, A. R., & Cox, P. (1987). Peer-model attributes and children's achievement behaviors. *Journal of Educational Psychology, 79*, 54-61.

Schunk, D. H., & Swartz, C. W. (1993). Goals and progress feedback: Effects on self-efficacy and writing achievement. *Contemporary Educational Psychology, 18*, 337-354.

Schunk, D. H., & Zimmermanm B. J. (Eds.) (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Schunk, D. H., & Zimmermanm B. J. (Eds.) (1998). *Self-regulated learning: From teaching to self-reflective practice*. New York: Guilford.

Seligman, M. E. P. (1995). *The optimistic child: A proven program to safeguard children against depression and build lifelong resilience*. NSW: Random House Australia.

Shatte, A. J., Reivech, K., Gillham, J. E., & Seligman, M. E. P. (1999). Learned optimism in children. In C. R. Snyder (Ed.), *Coping: The psychology of what works* (pp. 165-181). New York: Oxford University Press.

Shavelson, R. J., & Bolus, R. (1982). Self-concept: The interplay of theory and methods. *Journal of Educational Psychology, 74*, 3-17.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46*, 407-441.

Shea, C. M., & Howell, J. M. (2000). Efficacy-performance spirals: An empirical test. *Journal of Management, 26*, 791-812.

Shell, D. F., Colvin, C., & Bruning, R. H. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 87*, 386-398.

Shute, R., McCarthy, K. R., & Roberts, R. (2007). Predictors of social competence in young adolescents with craniofacial anomalies. *International Journal of Clinical and Health Psychology, 7*(3), 595-613.

Singer, M. S., Stacey, B. G., & Lange, C. (1993). The relative utility of expectancy-value theory and social cognitive theory in predicting psychology student course goals and career aspirations. *Journal of Social Behavior and Personality, 8*(4), 703-714.

Sirin, S. R. (2005). Socio-economic status and academic achievement: A meta-analytic review of research. *Review of Educational Research, 75*(3), 417-453.

Skaalvik, E. M. (1994). Attribution of perceived achievement in school in general and in maths and verbal areas: Relations with academic self-concept and self-esteem. *British Journal of Educational Psychology, 64*, 133-143.

Skaalvik, E. M. (1996). *Self-enhancing and self-defeating ego-orientation: Two dimensions of ego-orientation*. Paper presented at the XXVI International Congress of Psychology, Montreal, Canada.

Skaalvik, E. M. (1997a). Issues in research on self-concept. In M. L. Maehr & P. R. Pintrich (Eds.), *Advances in motivation and achievement* (Vol. 10, pp. 51-97). Greenwich, CT: JAI Press.

Skaalvik, E. M. (1997b). Self-enhancing and self-defeating ego-orientation: Relations with task and avoidance orientation, achievement, self-perceptions, and anxiety. *Journal of Educational Psychology, 89*(1), 71-81.

Skaalvik, E. M., & Bong, M. (2003). Self-concept and self-efficacy revisited: A few notable differences and important similarities. In H. W. Marsh, R. G. Craven & D. M. McInerney (Eds.), *International advances in self research* (Vol. 1, pp. 67-89). Greenwich, CT: Information Age Publishing.

Skaalvik, E. M., & Hagtvet, K. A. (1990). Academic achievement and self-concept: An analysis of causal predominance in developmental perspective. *Journal of Personality and Social Psychology, 58*, 292-307.

Skaalvik, E. M., & Rankin, R. J. (1995). A test of the Internal/External Frame of Reference Model at different levels of math and verbal perception. *American Education Research Journal, 32*(1), 161-184.

Skaalvik, E. M., & Rankin, R. J. (1996a). *Studies of academic self-concept using a Norwegian modification of the SDQ.* Paper presented at the XXVI International Congress of Psychology, Montreal, Canada.

Skaalvik, E. M., & Rankin, R. J. (1996b). *Self-concept and self-efficacy: Conceptual analysis.* Paper presented at the Annual meeting of The American Educational Research Association, New York.

Skaalvik, E. M., & Rankin, R. J. (1998). *Self-concept, self-efficacy, and achievement in mathematics: A test of causal relations.* Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, CA.

Skaalvik, E. M., & Skaalvik, S. (2004a). Self-concept and self-efficacy: A test of the internal/external frame of reference model and predictions of subsequent motivation and achievement. *Psychological Reports, 95*(3), 1187-1202.

Skaalvik, S., & Skaalvik, E. M. (2004b). Gender differences in math and verbal self-concept, performance expectations, and motivation. *Sex Roles, 50*(3/4), 241-252.

Skaalvik, E. M., & Valas, H. (1999a). *Achievement and self-concept in mathematics and verbal arts: A study of relations.* Paper presented at the American Educational Research Association, Montreal, Canada.

Skaalvik, E. M., & Valas, H. (1999b). Relations among achievement, self-concept, and motivation in mathematics and language arts: A longitudinal study. *The Journal of Experimental Education, 67*(2), 135-149.

Skaalvik, E. M., Valas, H., & Sletta, O. (1994). Task involvement and ego involvement: Relations with academic achievement, academic self-concept and self-esteem. *Scandinavian Journal of Educational Research, 38*, 231-243.

Skinner, E. A., Wellborn, J., & Connell, J. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement at school. *Journal of Educational Psychology, 82*, 22-32.

Spinath, B., & Spinath, F. M. (2005). Longitudinal analysis of the link between learning motivation and competence beliefs among elementary school children. *Learning and Instruction, 15*, 87-102.

Spinath, B., & Steinmayr, R. (2008). Longitudinal analysis of intrinsic motivation and competence beliefs: Is there a relation over time? *Child Development, 79*(5), 1555-1569.

Stajkovic, A. D., & Sommer, S. M. (2000). Self-efficacy and causal attributions: Direct and reciprocal links. *Journal of Applied Social Psychology, 30*(4), 707-737.

StataCorp (2009). *STATA Statistical Software: Release 11*. College Station, TX: StataCorp LP.

Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Stipek, D. J. (1993). *Motivation to learn: From theory to practice*. Boston, MA: Allyn and Bacon.

Super, D. E. (1990). A life-span, life-space approach to career development. In D. Brown & L. Brooks (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197-261). San Francisco: Jossey-Bass.

Swann, W. B. (1997). The trouble with change: Self-verification and allegiance to the self. *Psychological Science, 8*, 177-180.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). London: Allyn and Bacon.

Tanaka, A., & Yamauchi, H. (2001). A model of achievement motives, goal orientations, intrinsic interest, and academic achievement. *Psychological Reports, 88*, 123-135.

Tanzer, N. K. (1996). *Interest and competence as components of academic self-concepts for the Self Description Questionnaire I.* Paper presented at the XXVI International Congress of Psychology, Montreal, Canada.

Tennen, H., & Herzberger, S. (1987). Depression, self-esteem, and the absence of self-protective biases. *Journal of Personality and Social Psychology, 52*, 72-80.

Tepper, B. J., & Tepper, K. (1993). The effects of method variance within measures. *The Journal of Psychology, 127*(3), 293-302.

Thompson, B. & Daniel, L. G. (1996). Factor analytic evidence for the construct validity of scores: A historical overview and some guidelines. *Educational and Psychological Measurement, 56*(2), 197-208.

Toner, J., & Rountree, M. (2003/2004). Transformative and educative power of critical thinking. *Inquiry: Critical Thinking Across the Disciplines, 23*(1-2), 81-85.

TPI (2000). *The Pacific Institute: Go For It! manual (Version 2).* Seattle: Washington Publishers.

Trent, L. M. Y., Russell, G., & Cooney, G. (1994). Asssessment of self-concept in early adolescence. *Australian Journal of Psychology, 46*(1), 21-28.

Trent, L. M. Y., Cooney, G., Russell, G., & Warton, P. M. (1996). Significant others' contribution to early adolescents' perceptions of their competence. *British Journal of Educational Psychology, 66*, 95-107.

Turner, L. A., & Johnson, B. (2003). A model of mastery motivation for at-risk preschoolers. *Journal of Educational Psychology, 95*(3), 495-505.

Twenge, J. M., & Campbell, W. K. (2001). Age and birth cohort differences in self-esteem: A cross-temporal meta-analysis. *Personality and Social Psychology Review, 5*(4), 321-344.

Ullman, J. B. (2001). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell (Eds.), *Using multivariate statistics* (4th ed., pp. 653-771). London: Allyn and Bacon.

Usher, E. L., & Pajares, F. (2008). Self-efficacy for self-regulated learning: A validation study. *Educational and Psychological Measurement, 68*, 443-463.

Valentine, J. C., DuBois, D. L., & Cooper, H. (2004). The relation between self-beliefs and academic achievement: A meta-analytic review. *Educational Psychologist, 39*(2), 111-133.

Vancouver, J. B., Thompson, C. M., & Williams, A. A. (2001). The changing signs in the relationships among self-efficacy, personal goals, and performance. *Journal of Applied Psychology, 86*(4), 605-620.

Vispoel, W. P. (1995). Self-concept in artistic domains: An extension of the Shavelson, Hubner, and Stanton (1976) Model. *Journal of Educational Psychology, 87*, 134-153.

Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcomes. *Review of Higher Education, 27*(1), 45-73.

Weiner, B. (1974). *Achievement motivation and attribution theory*. Morristown, NJ: General Learning Press.

Weiner, B. (1980). *Human motivation*. New York: Holt, Rinehart & Winston.

Weiner, B. (1986). *An attributional theory of motivation and emotion*. New York: Springer-Verlag.

Weiss, M. R., Bredemeier, B. J., & Shewchuk, R. M. (1985). An intrinsic/extrinsic motivation scale for the youth sport setting: A confirmatory factor analysis. *Journal of Sport Psychology, 7*, 75-91.

Wells, E. L., & Marwell, G. (1976). *Self-esteem: Its conceptualisation and measurement*. Beverly Hills, CA: Sage.

West, C. K., & Fish, J. A. (1973). *Relationship between self-concept and school achievement: A survey of empirical investigations (Final Report)*. Urbana, IL: National Institute of Education.

West, C. K., Fish, J. A., & Stevens, R. J. (1980). General self-concept, self-concept of academic ability and school achievement: Implications for "causes" of self-concept. *Australian Journal of Education, 24*, 194-213.

White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297-333.

Whitley, B. E., & Frieze, I. H. (1985). Children's causal atrributions for success and failure in acheivement settings: A meta-analysis. *Journal of Educational Psychology, 77*, 608-616.

Wichstrom, L. (1995). Harter's Self-Perception Profile for Adolescents: Reliability, validity, and evaluation of the question format. *Journal of Personality Assessment, 65*, 100-116.

Wigfield. A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review, 6*, 49-78.

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of motivation. *Contemporary Educational Psychology, 25*, 68-81.

Wigfield, A., & Eccles, J. S. (2002). The development of competence beliefs and values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 92-120). San Diego: Academic Press.

Wigfield, A., Eccles, J. S., Yoon, K. S., Harold, R. D., Arbreton, A. J. A., Freedman-Doan, C., et al. (1997). Change in children's competence beliefs and subjective task values across the elementary school years: A three-year study. *Journal of Educational Psychology, 89*, 451-469.

Wigfield, A., & Karpathian, M. (1991). Who I am and what I can do: Children's concepts and motivation in achievement situations. *Educational Psychologist, 26*, 233-261.

Wilgenbusch, T., & Merrell, K. W. (1999). Gender differences in self-concept among children and adolescents: A meta-analysis of multidimensional studies. *School Psychology Quarterly, 14*, 723-744.

Wilson, P., & Cooper, C. (2008). Finding the magic number. *Methods, 21*, 866-867.

Wingate, J. G. (1979). *Non-intellectual correlates of attrition among disadvantaged adults* (ERIC Reproduction Services, No. ED178670).

Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology, 56*, 407-415.

Worrell, F. C. (1997). An exploratory factor analysis of Harter's Self-Perception Profile for Adolescents with academically talented students. *Educational and Psychological Measurement, 57*, 1016-1024.

Wylie, R. C. (1968). The present status of self-theory. In E. Borgotta & W. Lambert (Eds.), *Handbook of personality theory and research* (pp. 728-787). Chicago: Rand McNally.

Wylie, R. C. (1974). *The self-concept, Vol. 1: A review of methodological considerations and measuring instruments* (Revised ed.). Lincoln: University of Nebraska Press.

Wylie, R. C. (1979). *The self-concept, Vol. 2: Theory and research on selected topics* (Revised ed.). Lincoln: University of Nebraska Press.

Yang, M. L., Chuang, H. H., & Chiou, W. B. (2009). Long-term costs of inflated self-estimate on academic performance among adolescent students: A case of second language achievements. *Psychological Reports, 105*(3), 727-737.

Yeung, A. S., Chui, H., Lau, I. C., McInerney, D. M., Russell-Bowie, D., & Suliman, R. (2000). Where is the hierarchy of academic self-concept? *Journal of Educational Psychology, 92*(3), 556-567.

Young, D. J. (1997). *Self-esteem in rural schools: Dreams and aspirations.* Paper presented at the 13th National Conference of the Society for Provision of Education in Rural Australia (SPERA), Adelaide, South Australia.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82-91.

Zimmerman, B. J., Bandura, A., & Martinez-Ponz, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29*(3), 663-676.

Zimmerman, B. J., & Kitsantas, A. (1997). Developmental phases in self-regulation: Shifting from process to outcome goals. *Journal of Educational Psychology, 89*, 29-36.

Zimmerman, B. J., & Kitsantas, A. (1999). Acquiring writing revision skill: Shifting from process to outcome self-regulatory goals. *Journal of Educational Psychology, 91*, 1-10.

Zimmerman, B. J., & Martinez-Ponz, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology, 82*(1), 51-59.

Zirkel, P. A. (1971). Self-concept and the "disadvantage" of ethnic group membership. *Review of Educational Research, 41*, 211-225.

7 APPENDICES

Appendix A.1 Piloting of Self-Efficacy and Self-Concept Measures

A series of pilot studies were conducted using the MSPSE and SPPA in order to determine their ease of completion and understanding, and their appropriateness for use with UK students (both measures were developed in the US and used American English terminology). Pilot studies were conducted with groups of around 20 Year 10 students (the same age-group as used for the main study). The pilot studies for the MSPSE and SPPA instruments are discussed in turn below.

The MSPSE

At the first pilot of the MSPSE a few words were judged by students as being either difficult to understand or culturally irrelevant. Consequently, a small number of changes were made to the wording of items to facilitate understanding and accommodate cultural differences. These are shown in Table A.1.1. A second pilot study incorporating these changes was conducted using a different sample of students. These students found the items easier to understand therefore no further revision or piloting of the MSPSE was deemed necessary.

Table A.1.1 Changes made to the wording of Bandura's (1990) ***Multidimensional Scales of Perceived Self-Efficacy*** **(the specific words changed are underlined)**

Item	Original wording	New wording
17	How well can you take notes of class instruction?	How well can you take notes in class?
24	How well can you participate in class discussions?	How well can you join in class discussions?
32	How well can you learn the things needed for team sports (for example, basketball, volleyball, swimming, football, soccer)?	How well can you learn the things needed for team sports (for example, football, netball, basketball, volleyball, swimming?)
36	How well can you resist peer pressure to drink beer, wine, or liquor?	How well can you resist peer pressure to drink alcohol?
37	How well can you resist peer pressure to smoke marijuana?	How well can you resist peer pressure to smoke marijuana (cannabis, pot, weed, draw)?
38	How well can you resist peer pressure to use pills (uppers, downers)?	How well can you resist peer pressure to take ecstasy?
39	How well can you resist peer pressure to use crack?	How well can you resist peer pressure to use crack (cocaine)?

The SPPA

Figure A.1.1 gives an example of an original item from the SPPA. Respondents are asked to decide which of the two statements is most like them and then asked to decide whether this is 'sort of true for me' or 'really true for me'. At the first pilot of the SPPA students found the words 'some teenagers' problematic: finding it difficult to relate this terminology to themselves. They also experienced problems with the two-stage format (this is consistent with previous research that suggests the original SPPA format is problematic, e.g. Marsh & Holmes, 1990; Wichstrom, 1995). Consequently, two types of revision were made to the measure. First, the word ‘I’ was used in place of ‘some teenagers’. This was to indicate to students that they needed to think about themselves when answering the questions, rather than other teenagers. Secondly, although participants in the pilot study found the original two-stage format time-consuming and difficult to understand, Harter argues that it discourages socially desirable responses. While it was considered important, therefore, to keep the two-stage format, a different *type* of two-stage format was devised in order to overcome problems associated with completion time and understanding. In the revised format (see Figures A.1.2 – A.1.5) students still responded to items in two stages: (a) choosing one of two opposing statements, as in Harter’s original format, then (b) choosing how well their answer to (a) reflects them as a person. This format still discourages desirable responses but the second stage is worded differently than in Harter’s SPPA original. Five additional pilot studies were conducted (with different students) in order to determine the optimum wording of stage (b) in terms of ease of understanding. The first of these (Figure A.1.2) reflected very closely Harter’s own wording of the SPPA items. The final response format is shown in Figure A.1.5. This asks students whether their answer to (a) is ‘always like you’ or ‘only sometimes like you’.

Figure A.1.1 An original SPPA item from Harter’s (1988) *Self-Perception Profile for Adolescents*

Really true for me	Sort of true for me				Sort of true for me	Really true for me
☐	☐	Some teenagers are happy with themselves most of the time	**BUT**	Other teenagers are often not happy with themselves	☐	☐

Figure A.1.2 Revised SPPA item: Response format 1

(a)		**(b)** Is your answer to (a):	
I am happy with myself most of the time	☐	Really true of you?	☐
I am often not happy with myself	☐	Sort of true of you?	☐

Figure A.1.3 Revised SPPA item: Response format 2

(a)		**(b)** Is your answer to (a):	
I am happy with myself most of the time	☐	Definitely like you?	☐
I am often not happy with myself	☐	Probably like you?	☐

Figure A.1.4 Revised SPPA item: Response format 3

(a)		**(b)** Is your answer to (a):	
I am happy with myself most of the time	☐	Always true of you?	☐
I am often not happy with myself	☐	Sometimes true of you?	☐

Figure A.1.5 Revised SPPA item: Final response format

(a)		**(b)** Is your answer to (a):	
I am happy with myself most of the time	☐	Always like you?	☐
I am often not happy with myself	☐	Only sometimes like you?	☐

A number of other changes were made to the wording of SPPA items to make them easier to understand. These are shown in Table A.1.2.

Table A.1.2 Changes made to the wording of Harter's (1988) *Self-Perception Profile for Adolescents* (the specific words changed are underlined)

Item	Original wording	New wording
6	Some teenagers feel that if they are <u>romantically interested</u> in someone, that person will like them back BUT Other teenagers worry that when they <u>like someone romantically</u>, that person *won't* like them back	I feel that if I <u>fancy</u> someone, that person will like me back / I worry that when I <u>fancy someone</u>, that person *won't* like me back
21	Some teenagers feel that they are better than others their age at sports BUT Other teenagers don't feel they can <u>play as</u> well	I feel that I am better than others my age at sports / I don't feel I can <u>play sports as well</u> as others my age
24	Some teenagers feel that people their age will <u>be romantically attracted</u> to them BUT Other teenagers worry about whether people their age will <u>be attracted</u> to them	I feel that people my age <u>will fancy</u> me / I worry about whether people my age will <u>fancy</u> me

Appendix A.2 Self-Efficacy Measure

(The Multidimensional Scales of Perceived Self-Efficacy – Bandura, 1990; see also Bandura, 2001).

Please rate how well you can do the things described below by putting a circle around the number that applies most to you.

(You can use any number from 1 to 7).

1. How well can you get teachers to help you when you get stuck on schoolwork?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

2. How well can you get another student to help you when you get stuck on schoolwork?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

3. How well can you get adults to help you when you have social problems?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

4. How well can you get a friend to help you when you have social problems?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

5. How well can you learn general mathematics?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

6. How well can you learn algebra?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

7. How well can you learn science?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

8. How well can you learn biology?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

9. How well can you learn reading, writing, and language skills?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

10. How well can you learn to use computers?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

11. How well can you learn a foreign language?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

12. How well can you learn social studies?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

13. How well can you learn English grammar?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

14. How well can you finish your homework assignments by deadlines?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

15. How well can you study when there are other interesting things to do?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

16. How well can you concentrate on school subjects?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

17. How well can you take notes in class?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

18. How well can you use the library to get information for school assignments?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

19. How well can you plan your schoolwork?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

20. How well can you organise your schoolwork?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

21. How well can you remember information that is presented in class and in textbooks?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

22. How well can you arrange a place to study without distractions?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

23. How well can you motivate yourself to do schoolwork?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

24. How well can you join in class discussions?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

25. How well can you learn sports skills?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

26. How well can you learn dance skills?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

27. How well can you learn music skills?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

28. How well can you do the kinds of things needed to be a member of the school newspaper?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

29. How well can you do the things needed to be a member of the school government?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

30. How well can you do the kinds of things needed to take part in school plays?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

31. How well can you do regular physical education activities?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

32. How well can you learn the things needed for team sports (for example, football, netball, basketball, volleyball, swimming?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

33. How well can you resist peer pressure to do things in school that can get you into trouble?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

34. How well can you stop yourself from skipping school when you feel bored or upset?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

35. How well can you resist peer pressure to smoke cigarettes?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

36. How well can you resist peer pressure to drink alcohol?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

37. How well can you resist peer pressure to smoke marijuana (cannabis, pot, weed, draw)?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

38. How well can you resist peer pressure to take ecstasy?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

39. How well can you resist peer pressure to use crack (cocaine)?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

40. How well can you resist peer pressure to have sexual intercourse?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

41. How well can you control your temper?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

42. How well can you live up to what your parents expect of you?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

43. How well can you live up to what your teachers expect of you?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

44. How well can you live up to what your peers expect of you?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

45. How well can you live up to what you expect of yourself?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

46. How well can you make and keep friends of the opposite sex?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

47. How well can you make and keep friends of the same sex?						
1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

48. How well can you carry on conversations with others?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

49. How well can you work in a group?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

50. How well can you express your opinions when other classmates disagree with you?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

51. How well can you stand up for yourself when you feel that you are being treated unfairly?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

52. How well can you deal with situations where others are annoying you or hurting your feelings?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

53. How well can you stand firm to someone who is asking you to do something unreasonable or inconvenient?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

54. How well can you get your parents to help you with a problem?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

55. How well can you get your brother(s) and sister(s) to help you with a problem?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

56. How well can you get your parents to take part in school activities?

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

57. How well can you get people outside the school to take an interest in your school (for example, people in the community, groups, churches, etc.)

1	2	3	4	5	6	7
not well at all		not too well		pretty well		very well

Appendix A.3 Self-Concept Measure

(The Self-Perception Profile for Adolescents – Harter, 1988)

(Note: positive and negative indicators to be removed prior to use)

READ THESE INSTRUCTIONS REALLY CAREFULLY

There are two parts to each question: (a) and (b).

Answer part (a) first – tick the box that most describes you.

Then go on to part (b) – decide whether your answer to part (a) is 'always like you' or 'only sometimes like you' and tick the box that describes you.

Sample Question 1 **(a)**		**(b)** Is your answer to (a):	
I would rather play outdoors in my spare time		Always like you?	
I would rather watch TV in my spare time		Only sometimes like you?	

Sample Question 2 **(a)**		**(b)** Is your answer to (a):	
I like hamburgers better than hotdogs		Always like you?	
I like hotdogs better than hamburgers		Only sometimes like you?	

1(a)		**1(b)** Is your answer to 1(a):	
I feel as if I am just as smart as others my age	+ve	Always like you?	
I'm not so sure and wonder if I am as smart	-ve	Only sometimes like you?	

2(a)		**2(b)** Is your answer to 2(a):	
I find it hard to make friends	-ve	Always like you?	
I find it pretty easy to make friends	+ve	Only sometimes like you?	

3(a)		**3(b)** Is your answer to 3(a):	
I do very well at all kinds of sports	+ve	Always like you?	
I don't feel that I am very good when it comes to sports	-ve	Only sometimes like you?	

4(a)		**4(b)** Is your answer to 4(a):	
I am *not* happy with the way I look	-ve	Always like you?	
I *am* happy with the way I look	+ve	Only sometimes like you?	

5(a)		**5(b)** Is your answer to 5(a):	
I feel that I am ready to do well at a part-time job	+ve	Always like you?	
I feel that I am not quite ready to handle a part-time job	-ve	Only sometimes like you?	

6(a)		**6(b)** Is your answer to 6(a):	
I feel that if I fancy someone, that person will like me back	+ve	Always like you?	
I worry that when I fancy someone, that person *won't* like me back	-ve	Only sometimes like you?	

7(a)		**7(b)** Is your answer to 7(a):	
I usually do the right thing	+ve	Always like you?	
I often don't do what I know is right	-ve	Only sometimes like you?	

8(a)		**8(b)** Is your answer to 8(a):	
I am able to make really close friends	+ve	Always like you?	
I find it hard to make really close friends	-ve	Only sometimes like you?	

9(a)		**9(b)** Is your answer to 9(a):	
I am often disappointed with myself	-ve	Always like you?	
I am often pretty pleased with myself	+ve	Only sometimes like you?	

10(a)		**10(b)** Is your answer to 10(a):	
I am pretty slow in finishing my schoolwork	-ve	Always like you?	
I can do my schoolwork quite quickly	+ve	Only sometimes like you?	

11(a)		**11(b)** Is your answer to 11(a):	
I have a lot of friends	+ve	Always like you?	
I don't have very many friends	-ve	Only sometimes like you?	

12(a)		**12(b)** Is your answer to 12(a):	
I think I could do well at just about any new athletic activity	+ve	Always like you?	
I am afraid I might not do well at a new athletic activity	-ve	Only sometimes like you?	

13(a)		**13(b)** Is your answer to 13(a):	
I wish my body was different	-ve	Always like you?	
I like my body the way it is	+ve	Only sometimes like you?	

14(a)		**14(b)** Is your answer to 14(a):	
I feel that I *don't* have enough skills to do well at a part-time job	-ve	Always like you?	
I feel that I *do* have enough skills to do a part-time job well	+ve	Only sometimes like you?	

15(a)		**15(b)** Is your answer to 15(a):	
I am *not* dating the people I am really attracted to	-ve	Always like you?	
I *am* dating the people that I am attracted to	+ve	Only sometimes like you?	

16(a)		**16(b)** Is your answer to 16(a):	
I often get in trouble for the things I do	-ve	Always like you?	
I usually *don't* do things that get me in trouble	+ve	Only sometimes like you?	

17(a)		**17(b)** Is your answer to 17(a):	
I do have a really close friend I can share secrets with	+ve	Always like you?	
I do not have a really close friend I can share secrets with	-ve	Only sometimes like you?	

18(a)		**18(b)** Is your answer to 18(a):	
I don't like the way I am leading my life	-ve	Always like you?	
I do like the way I am leading my life	+ve	Only sometimes like you?	

19(a)		**19(b)** Is your answer to 19(a):	
I do very well at my class work	+ve	Always like you?	
I don't do very well at my class work	-ve	Only sometimes like you?	

20(a)		**20(b)** Is your answer to 20(a):	
I am very hard to like	-ve	Always like you?	
I am really easy to like	+ve	Only sometimes like you?	

21(a)		**21(b)** Is your answer to 21(a):	
I feel that I am better than others my age at sports	+ve	Always like you?	
I don't feel I can play sports as well as others my age	-ve	Only sometimes like you?	

22(a)		**22(b)** Is your answer to 22(a):	
I wish my physical appearance was different	-ve	Always like you?	
I like my physical appearance the way it is	+ve	Only sometimes like you?	

23(a)		**23(b)** Is your answer to 23(a):	
I feel that I am old enough to get and keep a part-time paying job	+ve	Always like you	
I do not feel I am old enough, yet, to really handle a part-time job well	-ve	Only sometimes like you?	

24(a)		**24(b)** Is your answer to 24(a):	
I feel that people my age will fancy me	+ve	Always like you?	
I worry about whether people my age will fancy me	-ve	Only sometimes like you?	

25(a)		**25(b)** Is your answer to 25(a):	
I feel really good about the way I often act	+ve	Always like you?	
I *don't* feel good about the way I often act	-ve	Only sometimes like you?	

26(a)		**26(b)** Is your answer to 26(a):	
I wish I had a really close friend to share things with	-ve	Always like you?	
I *do* have a close friend to share things with	+ve	Only sometimes like you?	

27(a)		**27(b)** Is your answer to 27(a):	
I am happy with myself most of the time	+ve	Always like you?	
I am often not happy with myself	-ve	Only sometimes like you?	

28(a)		**28(b)** Is your answer to 28(a):	
I have trouble figuring out the answers in school	-ve	Always like you?	
I can almost always figure out the answers	+ve	Only sometimes like you?	

29(a)		**29(b)** Is your answer to 29(a):	
I am popular with others my age	+ve	Always like you?	
I am not very popular	-ve	Only sometimes like you?	

30(a)		**30(b)** Is your answer to 30(a):	
I don't do very well at new outdoor games	-ve	Always like you?	
I am good at new outdoor games right away	+ve	Only sometimes like you?	

31(a)		**31(b)** Is your answer to 31(a):	
I think that I am good looking	+ve	Always like you?	
I think that I am not very good looking	-ve	Only sometimes like you?	

32(a)		**32(b)** Is your answer to 32(a):	
I feel that I could do better at work that I get paid for	-ve	Always like you?	
I feel that I am doing really well at work that I get paid for	+ve	Only sometimes like you?	

33(a)		**33(b)** Is your answer to 33(a):	
I feel that I am fun and interesting on a date	+ve	Always like you?	
I wonder about how fun and interesting I am on a date	-ve	Only sometimes like you?	

34(a)		**34(b)** Is your answer to 34(a):	
I do things I know I shouldn't do	-ve	Always like you?	
I hardly ever do things I know I shouldn't do	+ve	Only sometimes like you?	

35(a)		**35(b)** Is your answer to 35(a):	
I find it hard to make friends that I can really trust	-ve	Always like you?	
I *am* able to make friends I can really trust	+ve	Only sometimes like you?	

36(a)		**36(b)** Is your answer to 36(a):	
I like the kind of person I am	+ve	Always like you?	
I often wish I were someone else	-ve	Only sometimes like you?	

37(a)		**37(b)** Is your answer to 37(a):	
I feel that I am pretty intelligent	+ve	Always like you?	
I question whether I am intelligent	-ve	Only sometimes like you?	

38(a)		**38(b)** Is your answer to 38(a):	
I feel that I am socially accepted by people my own age	+ve	Always like you?	
I wish that more people my age accepted me	-ve	Only sometimes like you?	

39(a)		**39(b)** Is your answer to 39(a):	
I do not feel that I am very athletic	-ve	Always like you?	
I feel that I *am* very athletic	+ve	Only sometimes like you?	

40(a)		**40(b)** Is your answer to 40(a):	
I really like my looks	+ve	Always like you?	
I wish I looked different	-ve	Only sometimes like you?	

41(a)		**41(b)** Is your answer to 41(a):	
I feel that I am really able to handle the work on a part-time paying job	+ve	Always like you?	
I wonder if I am really doing as good a job at work as I should be doing	-ve	Only sometimes like you?	

42(a)		**42(b)** Is your answer to 42(a):	
I usually *don't* go out with the people that I would really like to date	-ve	Always like you?	
I *do* go out with the people that I really want to date	+ve	Only sometimes like you?	

43(a)		**43(b)** Is your answer to 43(a):	
I usually act the way I know I am supposed to	+ve	Always like you?	
I often don't act the way I am supposed to	-ve	Only sometimes like you?	

44(a)		**44(b)** Is your answer to 44(a):	
I *don't* have a friend that is close enough to share really personal thoughts with	-ve	Always like you?	
I *do* have a close friend that I can share personal thoughts and feelings with	+ve	Only sometimes like you?	

45(a)		**45(b)** Is your answer to 45(a):	
I am very happy being the way I am	+ve	Always like you?	
I often wish I were different	-ve	Only sometimes like you?	

Appendix A4 Comparison of Factor Structures

Table A.4.1 Comparison of first-order factor structures: The self-efficacy first-order structure, self-concept first-order structure, and competency first-order structure compared to the original MSPSE and SPPA structures, with Cronbach's Alpha reliabilities

First-order factor structures														
MSPSE structure			Self-efficacy structure			Competency structure			Self-concept structure			SPPA structure		
Code	Factor	α	Code	Factor	α	Code	Factor	α	Code	Factor	α	Code	Factor	α
B1	Self-Efficacy in Enlisting Social Resources	0.62												
B2[a]	Self-Efficacy for Academic Achievement	0.84	SF5	Communication/ Performing Arts Self-Efficacy	0.80	CY9	Communication/ Performing Arts Self-Efficacy	0.77	SC8	Scholastic Self-Concept	0.76	H1	Scholastic Competence	0.76
			SF7	Maths/Science Self-Efficacy	0.78	CY8	Maths/Science Competency	0.79						
B3	Self-Efficacy for Self-Regulated Learning	0.90	SF1	Self-Efficacy for Self-Regulated Learning	0.92	CY1	Self-Efficacy for Self-Regulated Learning	0.92						
B4[b]	Self-Efficacy for Leisure-Time Skills & Extracurricular Activities	0.79	SF4	Sports Self-Efficacy	0.88	CY2	Athletics/Sports Competency	0.92	SC4	Athletic Self-Concept	0.89	H3	Athletic Competence	0.89
B5	Self-Regulatory Efficacy	0.84	SF2	Self-Regulatory Efficacy for Good Conduct	0.84	CY5	Self-Regulatory Efficacy for Good Conduct	0.83						
B6[b]	Self-Efficacy to Meet Others' Expectations	0.84				CY10	Good Conduct Competency	0.88	SC3	Behavioural Conduct Self-Concept	0.75	H7	Behavioural Conduct	0.74

Table continued over the page…

First-order factor structures														
MSPSE structure			**Self-efficacy structure**			**Competency structure**			**Self-concept structure**			**SPPA structure**		
Code	**Factor**	**α**	**Code**	**Factor**	**α**	**Code**	**Factor**	**α**	**Code**	**Factor**	**α**	**Code**	**Factor**	**α**
B7	Social Self-Efficacy	0.78												
B8	Self-Assertive Efficacy	0.83	SF3	Self-Assertive Efficacy	0.86	CY7	Self-Assertive Efficacy	0.86						
B9[c]	Self-Efficacy for Enlisting Parental & Community Support	0.68	SF6	Social Self-Regulatory Efficacy	0.76									
						CY3[c]	Friendship Self-Concept	0.79	SC2	Close Friendship Self-Concept	0.75	H8	Close Friendship	0.75
									SC6	Social Acceptance Self-Concept	0.77	H2	Social Acceptance	0.75
						CY4	Physical Appearance Self-Concept	0.87	SC1	Physical Appearance Self-Concept	0.88	H4	Physical Appearance	0.88
						CY6	Job Self-Concept	0.73	SC5	Job Self-Concept	0.73	H5	Job Competence	0.61
									SC7	Romantic Appeal Self-Concept	0.67	H6	Romantic Appeal	0.67

Note: Factor codes for the self-efficacy, self-concept and self-competence factors are consistent with the order factors loaded in the relevant factor analyses. Factors are mapped across columns with comparable factors from other structures. Empty cells indicate that there is no comparable factor.
MSPSE–*Multidimensional Scales of Perceived Self-Efficacy* (Bandura, 1990). SPPA–*Self-Perception Profile for Adolescents* (Harter, 1988). *Code number prefixes*: 'B'–original MSPSE factor; 'SF'–self-efficacy factor; 'C'–competency factor; 'SC'–self-concept factor; 'H'–original SPPA factor.
[a]Two factors in the self-efficacy and self-competence structures map onto this factor. [b]There is only partial comparability across structures for this factor. [c]Two factors in the self-concept and SPPA structures map onto this factor.

Table A.4.2 Comparison of second-order factor structures: The self-efficacy second-order structure, self-concept second-order structure, and competency second-order structure compared, indicating which first-order factors represent which second-order factors, with Cronbach's Alpha reliabilities

Second-order factor structures								
Self-efficacy second order structure			Competency second-order structure			Self-concept second-order structure		
Code	Factor	α	Code	Factor	α	Code	Factor	α
secSF1[a]	**Academic & Self-Management Efficacy** SF1 Self-Efficacy for Self-Regulated Learning; SF2 Self-Regulatory Efficacy for Good Conduct; SF6 Social Self-Regulatory Efficacy; SF7 Maths/Science Self-Efficacy	.79	secC1	**Academic Competency** C1 Self-Efficacy for Self-Regulated Learning; C8 Maths/Science Competency; C9 Communication/Performing Arts Self-Efficacy	.78	secSC2	**Scholastic & Behavioural Self-Concept** SC3 Behavioural Conduct Self-Concept; SC8 Scholastic Self-Concept	.56
			secC2	**Behavioural Conduct Competency** C5 Self-Regulatory Efficacy for Good Conduct; C10 Good Conduct Competency	.59			
secSF2[b]	**Social Self-Efficacy** SF3 Self-Assertive Efficacy; SF4 Sports Self-Efficacy; SF5 Communication/Performing Arts Self-Efficacy	.66	secC3	**Sports & Physical Appearance Competency** C2 Athletic/Sports Competency; C4 Physical Appearance Self-Concept	.59	secSC1	**Physical Self-Concept** SC1 Physical Appearance Self-Concept; SC4 Athletic Self-Concept	.60
			secC4	**Social Competency** C3 Friendship Self-Concept; C6 Job Self-Concept; C7 Self-Assertive Efficacy	.57	secSC3	**Social Self-Concept** SC2 Close Friendship Self-Concept; SC6 Social Acceptance Self-Concept; SC7 Romantic Appeal Self-Concept	.54

Note: Factor codes are consistent with the factor numbers presented in the relevant factor analyses. Factors are mapped across columns with comparable factors from other structures.
Code number prefixes: 'secSF'–second-order self-efficacy factor; 'secCY'–second-order competency factor; 'secSC'–second-order self-concept factor.
[a]Two factors in the competency structure map onto this factor. [b]Two factors in the competency and self-concept structures map onto this factor.

Appendix A.5 Abstract of Paper Published in the Journal of Personality Assessment

Hughes, A., Galbraith, D., & White, D. (2011). Perceived competence: A common core for self-efficacy and self-concept? *Journal of Personality Assessment, 93*(3), 1-12.

Abstract

This study uses Bandura's Multidimensional Scales of Perceived Self-Efficacy (MSPSE; Bandura, 1990) and Harter's Self-Perception Profile for Adolescents (SPPA; Harter, 1988) to examine the extent to which self-efficacy and competency-related elements of the self-concept are independent constructs. Factor analysis of data provided by 778 high school students revealed that when measured using domain-general measures such as the MSPSE and SPPA, self-efficacy and competency self-concept do not represent totally separate, distinct constructs. Overlap of dimensions occurs at both the first- and second-order levels of analysis. The practical and theoretical implications of these findings are discussed.

The full paper can be found at:

http://dx.doi.org/10.1080/00223891.2011.559390

Appendix B.1 Wording Changes to the Intrinsic Motivation Measure

Table B.1.1 Changes made to the wording of Harter's (1980, 1981) *Scale of Intrinsic versus Extrinsic Orientation in the Classroom* (the specific words changed are underlined)

Item	Original wording	New wording
9	Some kids know whether or not they're doing well in school without grades BUT Other kids need to have grades to know how well they are doing in school	I know whether or not I'm doing well in school without being given marks / I need to have marks to know how well I am doing in school
12	Some kids like to learn things on their own that interest them BUT Other kids think it's better to do things that the teacher thinks they should be learning	I like to learn things of my own choice, that interest me / I think it's better to learn the things that the teacher thinks I should be learning
15	If some kids get stuck on a problem they ask the teacher for help BUT Other kids keep trying to figure out the problem on their own	If I get stuck on a problem I ask the teacher for help / If I get stuck, I keep trying to figure out the problem on my own
16	Some kids like to go on to new work that's at a more difficult level BUT Other kids would rather stick to the assignments which are pretty easy to do	I like to go on to new work that's at a more difficult level / I would rather stick to the school work that is pretty easy to do

Appendix B.2 Motivation Measure

(A Scale of Intrinsic versus Extrinsic Orientation in the Classroom – Harter, 1980, 1981)

(Note: positive and negative indicators to be removed prior to use)

READ THESE INSTRUCTIONS REALLY CAREFULLY

There are two parts to each question: (a) and (b).

Answer part (a) first – tick the box that most describes you.

Then go on to part (b) – decide whether your answer to part (a) is 'always like you' or 'only sometimes like you' and tick the box that describes you.

1(a)		**1(b)** Is your answer to (a):	
I like hard work because it's a challenge	+ve	Always like you?	
I prefer easy work that I am sure I can do	-ve	Only sometimes like you?	

2(a)		**2(b)** Is your answer to 2(a):	
When I don't understand something right away I want the teacher to tell me the answer	-ve	Always like you?	
I would rather try and figure out the answer myself	+ve	Only sometimes like you?	

3(a)		**3(b)** Is your answer to 3(a):	
I work on problems to learn how to solve them	+ve	Always like you?	
I work on problems because I'm supposed to	-ve	Only sometimes like you?	

4(a)		**4(b)** Is your answer to 4(a):	
I almost always think that what the teacher says is OK	-ve	Always like you?	
I sometimes think that my own ideas are better	+ve	Only sometimes like you?	

5(a)		**5(b)** Is your answer to 5(a):	
I know when I've made mistakes without checking with the teacher	+ve	Always like you?	
I need to check with the teacher to know if I've made a mistake	-ve	Only sometimes like you?	

6(a)		**6(b)** Is your answer to 6(a):	
I like difficult problems because I enjoy trying to figure them out	+ve	Always like you?	
I don't like to figure out difficult problems	-ve	Only sometimes like you?	

7(a)		7(b) Is your answer to 7(a):	
I do my school work only because the teacher tells me to	-ve	Always like you?	
I do my school work to find out about a lot of things I've been wanting to know	+ve	Only sometimes like you?	

8(a)		8(b) Is your answer to 8(a):	
When I make a mistake I would rather figure out the right answer by myself	+ve	Always like you?	
I would rather ask the teacher how to get the right answer	-ve	Only sometimes like you?	

9(a)		9(b) Is your answer to 9(a):	
I know whether or not I'm doing well in school without being given marks	+ve	Always like you?	
I need to have marks to know how well I am doing in school	-ve	Only sometimes like you?	

10(a)		10(b) Is your answer to 10(a):	
I agree with the teacher because I think the teacher is right about most things	-ve	Always like you?	
I don't agree with the teacher sometimes and stick to my own opinion	+ve	Only sometimes like you?	

11(a)		11(b) Is your answer to 11(a):	
I would rather just learn what I have to in school	-ve	Always like you?	
I would rather learn about as much as I can	+ve	Only sometimes like you?	

12(a)		12(b) Is your answer to 12(a):	
I like to learn things of my own choice, that interest me	+ve	Always like you?	
I think it's better to learn the things that the teacher thinks I should be learning	-ve	Only sometimes like you?	

13(a)		13(b) Is your answer to 13(a):	
I read because I am interested in the subject	+ve	Always like you?	
I read because the teacher wants me to	-ve	Only sometimes like you?	

14(a)		14(b) Is your answer to 14(a):	
I need to get my report cards to tell me how well I am doing in school	-ve	Always like you?	
I know for myself how well I am doing even before I get my report cards	+ve	Only sometimes like you?	

15(a)		**15(b)** Is your answer to 15(a):	
If I get stuck on a problem I ask the teacher for help	-ve	Always like you?	
If I get stuck, I keep trying to figure out the problem on my own	+ve	Only sometimes like you?	

16(a)		**16(b)** Is your answer to 16(a):	
I like to go on to new work that's at a more difficult level	+ve	Always like you?	
I would rather stick to the school work that is pretty easy to do	-ve	Only sometimes like you?	

17(a)		**17(b)** Is your answer to 17(a):	
I think that what the teacher thinks of my work is the most important thing	-ve	Always like you?	
What *I* think of my work is the most important thing	+ve	Only sometimes like you?	

18(a)		**18(b)** Is your answer to 18(a):	
I ask questions in class because I want to learn new things	+ve	Always like you?	
I ask questions because I want the teacher to notice me	-ve	Only sometimes like you?	

19(a)		**19(b)** Is your answer to 19(a):	
I'm not really sure if I've done well on a test until I get my paper back with a mark on it	-ve	Always like you?	
I pretty much know how well I did even before I get my paper back	+ve	Only sometimes like you?	

20(a)		**20(b)** Is your answer to 20(a):	
I like the teacher to help me plan what to do next	-ve	Always like you?	
I like to make my own plans for what to do next	+ve	Only sometimes like you?	

21(a)		**21(b)** Is your answer to 21(a):	
I think I should have a say in what work I do at school	+ve	Always like you?	
I think that the teacher should decide what work I should do	-ve	Only sometimes like you?	

22(a)		**22(b)** Is your answer to 22(a):	
I like school subjects where it is pretty easy to just learn the answers	-ve	Always like you?	
I like those school subjects that make me think pretty hard and figure things out	+ve	Only sometimes like you?	

23(a)		**23(b)** Is your answer to 23(a):	
I'm not sure if my work is really good or not until the teachers tell me	-ve	Always like you?	
I know if my work is good or not before the teacher tells me	+ve	Only sometimes like you?	

24(a)		**24(b)** Is your answer to 24(a):	
I like to try to figure out how to do school projects on my own	+ve	Always like you?	
I would rather ask the teacher how it should be done	-ve	Only sometimes like you?	

25(a)		**25(b)** Is your answer to 25(a):	
If I do extra projects it is so that I can get better grades	-ve	Always like you?	
If I do extra projects it is because I want to learn about things that interest me	+ve	Only sometimes like you?	

26(a)		**26(b)** Is your answer to 26(a):	
I think it's best if I decide when to work on each school subject	+ve	Always like you?	
I think that the teacher is the best one to decide when to work on things	-ve	Only sometimes like you?	

27(a)		**27(b)** Is your answer to 27(a):	
I know whether or not I did my best on an project when I turn it in	+ve	Always like you?	
I have to wait until the teacher marks it to know that I didn't do as well as I could have	-ve	Only sometimes like you?	

28(a)		**28(b)** Is your answer to 28(a):	
I don't like difficult schoolwork because I have to work too hard	-ve	Always like you?	
I like difficult schoolwork because I find it more interesting	+ve	Only sometimes like you?	

29(a)		**29(b)** Is your answer to 29(a):	
I like to do my schoolwork without help	+ve	Always like you?	
I like to have the teacher help me to do my schoolwork	-ve	Only sometimes like you?	

30(a)		**30(b)** Is your answer to 30(a):	
I work really hard to get good grades	-ve	Always like you?	
I work hard because I really like to learn things	+ve	Only sometimes like you?	

Appendix B.3 Aspiration Measure

PLEASE ANSWER THESE QUESTIONS ABOUT YOUR PLANS FOR THE FUTURE:

1. What do you intend to be your <u>highest</u> level of educational/practical training?

(please tick ONE box only)

Attend university	☐	5
A Levels or similar study at 6th form or college	☐	4
Practical/technical training at college or on the job (e.g. apprenticeship)	☐	3
Leave school after getting GCSEs or similar qualifications	☐	2
Leave school without getting any qualifications	☐	1

2. Please write the name of the job that you hope you will end up in.

____

____

Appendix B.4 Occupational Aspiration Classifications

Table B.4.1 The National Statistics Socio-Economic Classification (NS-SEC) eight-class 'Analytic' codes and how they map on to the 'nine-class' codes used in this study

NS-SEC eight-class 'Analytic' codes		Nine-class code
Code	**Description**	
1	Higher managerial and professional occupations	
	1.1 Large employers and higher managerial occupations	9
	1.2 Higher professional occupations	8
2	Lower managerial and professional occupations	7
3	Intermediate occupations	6
4	Small employers and own account workers	5
5	Lower supervisory and technical occupations	4
6	Semi-routine occupations	3
7	Routine occupations	2
8	Never worked and long-term unemployed	1

Appendix B.5 Regression Sample: Diagnostic Checks

Sample size requirements

In order that the results of regression analysis will generalise to other samples, a minimum ratio of participants to predictors are required. Stevens (1996) suggests that 15 participants per predictor are required for a reliable regression equation. Tabachnick and Fidell (2001) have a slightly less conservative criterion, recommending the following formula:

Total N > 50 + 8m (where m = number of predictors)

In this research the model that has the highest number of predictors is that utilising the MSPSE/SPPA structure, which at Step 3 has 25 predictors in the model. Following Stevens' criterion a total sample size of 375 would be required. Following Tabachnick and Fidell's criterion, a total sample size of 250 would be required. The smallest sample size used here was that utilised for the analyses that have GCSE English as a dependent variable. This comprised 421 participants and therefore met both Stevens', and Tabachnick and Fidell's sample size requirements.

Outliers, multicollinearity and singularity

Multiple regression analysis is particularly sensitive to outliers. Outliers can distort the regression results so that they are more accurate for the outlier but less accurate for the other cases in the data set (Tabachnick & Fidell, 2001). In this research, however, as all the variables were created from a finite range of scores – for example, 1 to 8 in the cases of GCSE scores – and the data were screened for accuracy prior to any analyses, outliers were not considered to be an issue. Singularity occurs when one independent variable is a combination of two other variables. As this was not the case for any of the variables used here, singularity was also not considered to be an issue.

Multicollinearity refers to the relationships among the variables and exists when the independent variables, or predictors, are highly correlated (.9 and above; Pallant, 2007). Multicollinearity was examined using the variance inflation factor (VIF) statistics performed as part of the regression procedure. Myers (1990) suggests that a variance inflation factor above 10 could be indicative of multicollinearity. Collinearity diagnostics for these analyses showed that no variance inflation factor was above 4.66; therefore multicollinearity was not considered to be a problem.

Normality, linearity, and homoscedasticity of residuals

Residuals are the differences between the obtained and the predicted dependent variable scores. Assumptions of normality, linearity and homoscedasticity of the residuals refer to issues associated with the distribution of scores, and the underlying relationship between the predicted dependent variable scores and errors of prediction. For normality, the residuals should be normally distributed around the predicted dependent variable scores. For linearity, the residuals should have a straight-line relationship with the predicted dependent variable scores. For homoscedasticity, the variance of the residuals around the predicted dependent variable scores needs to be the same for all the predicted scores. These assumptions are examined by checking the residuals scatterplots, which can be generated as part of the regression procedure (Tabachnick & Fidell, 2001).

The scatterplots for these data showed linearity of the residuals in all cases. Non-normality of the residuals was demonstrated for the three GCSE variables. However, these were only slightly skewed and as the sample size was large there was no need to transform the variables. The scatterplots also indicated that a number of the variables were slightly heteroscedastic (i.e. they violated the assumption of homoscedasticity). To explore this further, a Breusch-Pagan test (Breusch & Pagan, 1979) was run. This tests the null hypothesis that the variance of the residuals is homogenous. If the p-value is very small, then we reject the null hypothesis and accept that the variance is not homogenous. The Breusch-Pagan tests indicated that there was significant heteroscedasticity in the self-esteem and occupational aspiration variables. Heteroscedasticity was also apparent within the GCSE Mathematics variable but this was only slight. Heteroscedasticity causes standard errors to be biased. Therefore, following the recommendations of Allison (1999), robust standard errors were reported here for all the regressions, instead of the default standard errors. Allison suggests that when heteroscedasticity is present, robust standard errors tend to be more trustworthy than the default errors. The robust standard errors do not change coefficient estimates but give p values that are more accurate than those associated with the default standard errors. Note that robust standard errors, which relax the assumption that the errors are normally distributed, are not to be confused with 'cluster robust' standard errors, which relax the assumption that the error terms are independent of each other, thereby allowing for 'clusters' within the data (STATA Online Resource Classes[41]).

[41] Class 3: Estimation. Accessible at http://web.missouri.edu/~kolenikovs/stata/Duke/class3.html

Appendix B.6 Regression Sample: Descriptive Statistics and Raw Correlations

Table B.6.1 Pearson's correlations between control variables, self-esteem and academic outcomes, with means, standard deviations and Total N

Controls / Academic outcomes		Academic outcomes								Prior acad. performance		
	Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science	KS3 Maths	KS3 English	KS3 Science
Controls												
Gender (male)	.19**	-.07	.07	.13**	.11**	-.01	.03	-.14**	.07	.06	-.17**	.06
Free school meals	-.09*	-.07	-.01	-.07	-.10*	-.02	-.15**	-.15**	-.21**	-.16**	-.16**	-.19**
Special educational needs	-.08*	-.16**	-.04	-.09*	-.08	-.06	-.28**	-.35**	-.28**	-.33**	-.32**	-.34**
Low ACORN	-.06	-.09*	-.04	-.01	-.04	.00	-.16**	-.14**	-.19**	-.09*	-.10**	-.16**
High ACORN	.05	.11**	.04	.02	.05	.04	.12**	.18**	.18**	.15**	.09*	.14**
ACORN score[a]	.06	.14**	.05	.01	.06	.02	.18**	.22**	.24**	.18**	.13**	.21**
Prior academic performance												
KS3 Mathematics	.09*	.43**	.25**	.31**	.29**	.16**	.78**	.68**	.71**	-		
KS3 English	.04	.39**	.28**	.20**	.22**	.20**	.59**	.73**	.61**	.68**	-	
KS3 Science	.12**	.45**	.30**	.29**	.28**	.21**	.72**	.73**	.78**	.84**	.75**	-
Motivation												
Mot 1: Independent Mastery	.16**	.20**	.17**	-								
Mot 2: Internal Criteria for Success	.14**	.21**	.19**	.33**	-							
Mot 3: Preference for Challenge	.09*	.23**	.19**	.49**	.25**	-						
Academic performance												
GCSE Mathematics	.13**	.43**	.27**	.31**	.24**	.18**	-					
GCSE English	.09*	.44**	.23**	.22**	.24**	.19**	.69**	-				
GCSE Science	.12**	.44**	.28**	.29**	.23**	.21**	.79**	.72**	-			
Mean	3.04	3.92	5.97	2.69	2.55	2.73	3.92	4.30	4.03	5.40	5.65	5.43
Standard deviation	0.79	1.17	1.73	0.67	0.80	0.68	1.71	1.60	1.63	1.01	1.21	1.04
Total N[b]	778	761	652	581	581	581	746	724	697	736	745	723

Note: Correlations were calculated using all available data, excluding cases pairwise to achieve the largest possible sample sizes for comparison. Sample sizes vary from 523 to 778 for the various correlations. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator. Educ asps–Educational aspirations. Occup asps–Occupational aspirations. Mot 1–Independent Mastery; Mot 2–Internal Criteria for Success; Mot 3–Preference for Challenge.
[a]ACORN score was not used as a control variable within the regressions but has been included here to show correlations using the full 56-point scale. [b]Represents the total number of participants within each group. Means and standard deviations are derived from the Total N. *Correlation is significant at p < .05. **Correlation is significant at p < .01.

Table B.6.2 Pearson's correlations between self-perception and control variables, and means and standard deviations for the self-perception variables

Factor structures		Control variables						Mean		SD	
Code	Factor name	Gender (male)	Free school meals	Special educ. needs	Low ACORN	High ACORN	ACORN score[a]	Original scale	28-point scale	Original scale	28-point scale
MSPSE											
B1	Enlisting Social Resources	-.11**	-.09*	-.11**	-.03	.00	.03	5.02	20.10	0.95	3.80
B2	Academic Achievement	.07	-.09*	-.12**	-.04	.07*	.07*	4.79	19.17	0.93	3.74
B3	Self-Regulated Learning	-.00	-.05	-.09*	-.03	.08*	.08*	4.50	18.01	1.04	4.15
B4	Leisure-Time/Extracurricular Activities	-.01	-.03	-.03	-.03	.03	.05	4.42	17.69	1.07	4.27
B5	Self-Regulatory Efficacy	-.06	-.05	-.16**	-.08*	.07*	.10**	5.45	21.79	1.14	4.55
B6	Meet Others' Expectations	.04	-.06	-.11**	-.05	.03	.06	4.95	19.78	1.19	4.78
B7	Social Self-Efficacy	-.07	-.04	-.18**	-.06	.00	.05	5.68	22.70	0.97	3.88
B8	Self-Assertive Efficacy	.03	-.04	-.15**	-.04	.05	.04	5.18	20.74	1.18	4.71
B9	Parental/Community Support	.04	.03	-.07*	-.03	.01	.04	4.32	17.30	1.23	4.92
Self-Efficacy (First-Order)											
SF1	Self-Regulated Learning	-.01	-.06	-.09*	-.04	.09*	.10**	4.51	18.05	1.09	4.37
SF2	Self-Regulatory – Good Conduct	-.08*	-.04	-.14**	-.07*	.07	.09**	5.61	22.43	1.18	4.73
SF3	Self-Assertive Efficacy	.03	-.05	-.18**	-.04	.04	.05	5.20	20.82	1.04	4.17
SF4	Sports Self-Efficacy	.26**	-.08*	-.03	-.03	.01	.04	5.05	20.18	1.49	5.95
SF5	Communication/Performing Arts	-.18**	-.02	-.05	-.03	.04	.06	4.22	16.90	1.55	4.31
SF6	Self-Regulatory – Social	.03	-.01	-.09*	-.03	.02	.05	4.57	18.28	1.04	4.15
SF7	Mathematics/Science Self-Efficacy	.15**	-.09*	-.08*	-.04	.05	.06	4.70	18.79	1.08	4.32
Self-Efficacy (Second-Order)											
secSF1	Academic & Self-Management	.02	-.06	-.13**	-.06	.07*	.09**	4.85	19.39	0.87	3.45
secSF2	Social Self-Efficacy	.08*	-.07	-.10**	-.05	.04	.06	4.82	19.30	0.94	3.74
SPPA											
H1	Scholastic Competence	.08*	-.10**	-.20**	-.01	.11**	.08*	2.91	20.34	0.77	5.38
H2	Social Acceptance	.04	-.10**	-.18**	-.04	.02	.03	3.32	23.26	0.67	4.68
H3	Athletic Competence	.34**	-.07*	.01	-.02	.03	.03	2.50	17.47	0.98	6.83
H4	Physical Appearance	.32**	-.02	.02	-.02	.02	.00	2.57	17.97	0.98	6.86
H5	Job Competence	.01	-.10**	-.11**	-.07	.15**	.13**	3.11	21.78	0.62	4.34
H6	Romantic Appeal	.14**	-.02	-.02	-.01	.04	.02	2.61	18.26	0.75	5.22
H7	Behavioural Conduct	.02	-.07	-.13**	-.07	.10**	.11**	2.80	19.56	0.76	5.35
H8	Close Friendship	-.20**	-.04	-.15**	-.04	.06	.06	3.36	23.48	0.70	4.93

Table continued over the page…

Table B.6.2 continued…

Factor structures		Control variables						Mean		SD	
Code	Factor name	Gender (male)	Free school meals	Special educ. needs	Low ACORN	High ACORN	ACORN score[a]	Original scale	28-point scale	Original scale	28-point scale
Self-Concept (First-Order)											
SC1	Physical Appearance	.33**	-.02	.01	-.02	.02	.00	2.56	17.90	0.09	6.46
SC2	Close Friendship	-.22**	-.03	-.14**	-.03	.05	.05	3.34	23.36	0.77	5.37
SC3	Behavioural Conduct	.00	-.07*	-.12**	-.07*	.11**	.13**	2.75	19.22	0.08	5.89
SC4	Athletic Self-Concept	.34**	-.07*	.01	-.02	.03	.03	2.50	17.47	0.98	6.83
SC5	Job Self-Concept	.04	-.09*	-.10**	-.07	.12**	.11**	3.33	23.30	0.69	4.82
SC6	Social Acceptance	.03	-.10**	-.18**	-.04	.03	.04	3.34	23.38	0.64	4.47
SC7	Romantic Appeal	-.06	-.02	-.06	-.01	.06	.03	2.84	19.90	1.00	7.00
SC8	Scholastic Self-Concept	.08*	-.10**	-.20**	-.01	.11**	.08*	2.91	20.34	0.77	5.38
Self-Concept (Second-Order)											
secSC1	Scholastic & Behavioural	.40**	-.06	.01	-.02	.03	.02	2.53	17.69	0.80	5.61
secSC2	Physical Self-Concept	.04	-.10**	-.19**	-.05	.13**	.13**	2.82	19.78	0.67	4.67
secSC3	Social Self-Concept	-.12**	-.06	-.16**	-.03	.07	.06	3.17	22.21	0.59	4.13
Self-esteem		.19**	-.09*	-.08*	-.06	.05	.06	3.04	21.27	0.79	5.52
Competency (First-Order)											
CY1	Self-Regulated Learning Self-Efficacy	-.01	-.07	-.10**	-.05	-.09*	.10**	4.54	18.17	1.06	4.26
CY2	Athletics/Sports Competency	.33**	-.08*	-.01	-.02	.02	.04	-	18.49	-	6.11
CY3	Friendship Self-Concept	-.12**	-.07	-.20**	-.04	.06	.06	3.37	23.62	0.59	4.10
CY4	Physical Appearance Self-Concept	.34**	-.01	.02	-.01	.02	-.00	2.51	17.54	0.87	6.09
CY5	Self-Regulatory Eff – Good Conduct	-.10**	-.01	-.12**	-.06	.05	-.08*	5.75	23.02	1.29	5.14
CY6	Job Self-Concept	.04	-.09*	-.10**	-.07	.12**	.11**	3.33	23.30	0.69	4.82
CY7	Self-Assertive Efficacy	.01	-.05	-.19**	-.04	.04	.04	5.27	21.09	1.06	4.23
CY8	Mathematics/Science Competency	.17**	-.11**	-.13**	-.04	.09*	.08*	-	19.36	-	4.45
CY9	Communication/Arts Self-Efficacy	-.21**	-.02	-.06	-.03	.06	.07	4.27	17.06	1.04	4.16
CY10	Good Conduct Competency	.02	-.07*	-.14**	-.07*	.10**	.11**	-	19.68	-	4.67
Competency (Second-Order)											
secCY1	Academic Competency	-.01	-.08*	-.12**	-.05	.10**	.10**	-	18.20	-	3.56
secCY2	Behavioural Conduct Competency	-.05	-.05	-.15**	-.08*	.09*	.11**	-	21.35	-	4.19
secCY3	Sports & Physical Appearance	.39**	-.05	.01	-.02	.02	.02	-	18.01	-	5.19
secCY4	Social Competency	-.03	-.09**	-.22**	-.07	.10**	.10**	-	22.67	-	3.25

Note: Correlations were calculated using all available data, excluding cases pairwise to achieve the largest possible sample sizes for comparison. N = 765 for ACORN variables; N = 778 for Gender; Free school meals; and Special educational needs. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator. [a]ACORN score was not used as a control variable within the regressions but has been included here to show correlations using the full 56-point scale. *Correlation is significant at p < .05. **Correlation is significant at p < .01.

Table B.6.3 Pearson's correlations between self-perception variables, self-esteem, prior academic performance and academic outcomes

Factor structures			Academic outcomes								Prior acad. performance		
Code	**Factor name**	**Self-esteem**	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**	**KS3 Maths**	**KS3 English**	**KS3 Science**
MSPSE													
B1	Enlisting Social Resources	.49**	.15**	-.02	.10*	.16**	.17**	.11**	.18**	.09*	.17**	.11**	.12**
B2	Academic Achievement	.33**	.38**	.24**	.40**	.28**	.40**	.35**	.33**	.34**	.28**	.34**	.36**
B3	Self-Regulated Learning	.51**	.31**	.14**	.36**	.22**	.49**	.23**	.25**	.25**	.16**	.17**	.20**
B4	Leisure-Time/Extracurricular Activities	.42**	.19**	.12**	.19**	.16**	.17**	.13**	.11**	.10*	.08*	.12**	.12**
B5	Self-Regulatory Efficacy	.23**	.21**	.15**	.23**	.07	.36**	.20**	.23**	.27**	.24**	.17**	.26**
B6	Meet Others' Expectations	.41**	.32**	.20**	.27**	.15**	.34**	.25**	.26**	.30**	.22**	.19**	.26**
B7	Social Self-Efficacy	.30**	.19**	.13**	.15**	.19**	.14**	.15**	.21**	.13**	.18**	.16**	.20**
B8	Self-Assertive Efficacy	.33**	.16**	.11**	.21**	.24**	.16**	.18**	.21**	.18**	.20**	.22**	.22**
B9	Parental/Community Support	.29**	.17**	.07	.16**	.14**	.20**	.10**	.09*	.12**	.08*	.04	.07*
Self-Efficacy (First-Order)													
SF1	Self-Regulated Learning	.34**	.30**	.13**	.35**	.21**	.49**	.21**	.24**	.24**	.15**	.16**	.18**
SF2	Self-Regulatory – Good Conduct	.20**	.20**	.14**	.21**	.07	.34**	.18**	.21**	.24**	.24**	.16**	.25**
SF3	Self-Assertive Efficacy	.36**	.21**	.13**	.23**	.27**	.19**	.20**	.23**	.19**	.21**	.23**	.24**
SF4	Sports Self-Efficacy	.30**	.10**	.10*	.16**	.14**	.11*	.14**	.07*	.11**	-.00	.14**	.11**
SF5	Communication/Performing Arts	.17**	.26**	.14**	.19**	.17**	.22**	.12**	.17**	.10**	.17**	.13**	.15**
SF6	Self-Regulatory – Social	.37**	.21**	.10**	.19**	.14**	.25**	.14**	.15**	.16**	.12**	.06	.11**
SF7	Mathematics/Science Self-Efficacy	.33**	.38**	.25**	.45**	.28**	.40**	.41**	.32**	.42**	.26**	.39**	.41**
Self-Efficacy (Second-Order)													
secSF1	Academic & Self-Management	.39**	.35**	.20**	.39**	.22**	.48**	.30**	.30**	.34**	.25**	.25**	.31**
secSF2	Social Self-Efficacy	.35**	.23**	.15**	.24**	.24**	.21**	.19**	.19**	.17**	.14**	.20**	.20**
SPPA													
H1	Scholastic Competence	.43**	.35**	.25**	.39**	.31**	.36**	.38**	.39**	.38**	.31**	.37**	.40**
H2	Social Acceptance	.41**	.07*	.08*	.10*	.22**	.03	.11**	.11**	.07	.09*	.09*	.07
H3	Athletic Competence	.32**	-.01	.07	.05	.14**	.01	.05	-.01	.05	-.11**	.04	.01
H4	Physical Appearance	.66**	-.06	.02	.06	.10*	.05	.02	-.07	.01	-.09*	.00	-.02
H5	Job Competence	.22**	.15**	.11**	.17**	.16**	.22**	.13**	.12**	.10*	.14**	.13**	.19**
H6	Romantic Appeal	.40**	.03	.03	.07	.14**	.05	.03	.02	-.02	-.05	.03	-.02
H7	Behavioural Conduct	.41**	.22**	.14**	.30**	.14**	.37**	.22**	.22**	.26**	-.20**	.16**	.20**
H8	Close Friendship	.23**	.13**	.05	.09*	.12**	.14**	.11**	.15**	.05	.16**	.13**	.12**

Table continued over the page…

Table B.6.3 continued…

Factor structures			Academic outcomes								Prior acad. performance		
Code	**Factor name**	**Self-esteem**	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**	**KS3 Maths**	**KS3 English**	**KS3 Science**
Self-Concept (First-Order)													
SC1	Physical Appearance	.66**	-.05	.03	.07	.12**	.05	.02	-.06	.00	-.10**	.00	-.02
SC2	Close Friendship	.20**	.12**	.04	.07	.10*	.14**	.10**	.14**	.05	.16**	.10**	.10**
SC3	Behavioural Conduct	.30**	.22**	.13**	.29**	.12**	.36**	.22**	.23**	.27**	.21**	.16**	.22**
SC4	Athletic Self-Concept	.32**	-.01	.07	.05	.14**	.01	.05	-.01	.05	-.11**	.04	.01
SC5	Job Self-Concept	.22**	.13**	.10**	.16**	.13**	.18**	.13**	.10*	.08*	.13**	.13**	.18**
SC6	Social Acceptance	.41**	.09*	.08*	.12**	.22**	.05	.12**	.12**	.07	.10**	.10**	.09*
SC7	Romantic Appeal	.20**	.02	.01	-.01	.07	.03	.03	.08*	-.00	.02	.04	.01
SC8	Scholastic Self-Concept	.43**	.35**	.25**	.39**	.31**	.36**	.38**	.39**	.38**	.31**	.37**	.40**
Self-Concept (Second-Order)													
secSC1	Scholastic & Behavioural	.57**	-.04	.06	.07	.15**	.04	.04	-.05	.03	-.12**	.02	-.01
secSC2	Physical Self-Concept	.44**	.34**	.22**	.41**	.25**	.44**	.35**	.37**	.39**	.31**	.31**	.36**
secSC3	Social Self-Concept	.35**	.10**	.05	.07	.16**	.10*	.10**	.15**	.04	.12**	.11**	.08*
Self-esteem		-	.08*	.07	.16**	.14**	.09*	.13**	.09*	.12**	.04	.09*	.12*
Competency (First-Order)													
CY1	Self-Regulated Learning Self-Efficacy	.34**	.31**	.14**	.36**	.22**	.41**	.21**	.26**	.24**	.17**	.16**	.19**
CY2	Athletics/Sports Competency	.33**	.03	.09*	.09*	.15**	.05	.09*	.02	.07	-.07*	.07*	.04
CY3	Friendship Self-Concept	.35**	.13**	.08*	.12**	.18**	.12**	.13**	.16**	.07	.16**	.12**	.12**
CY4	Physical Appearance Self-Concept	.65**	-.04	.02	.07	.12**	.05	.02	-.07	-.01	-.11**	-.01	-.03
CY5	Self-Regulatory Efficacy – Good	.17**	.15**	.12**	.17**	.03	.29**	.12**	.16**	.19**	.19**	.10**	.21**
CY6	Job Self-Concept	.22**	.13**	.10**	.16**	.13**	.18**	.13**	.10*	.08*	.13**	.13**	.18**
CY7	Self-Assertive Efficacy	.36**	.18**	.12**	.21**	.25**	.17**	.18**	.22**	.18*	.20**	.22**	.22**
CY8	Mathematics/Science Competency	.39**	.40**	.29**	.48**	.34**	.39**	.47**	.37**	.45**	.31**	.46**	.47**
CY9	Communication/Arts Self-Efficacy	.19**	.25**	.13**	.19**	.16**	.22**	.13**	.18**	.09*	.17**	.12**	.14**
CY10	Good Conduct Competency	.45**	.29**	.19**	.34**	.17**	.42**	.27**	.27**	.33**	.24**	.20**	.26**
Competency (Second-Order)													
secCY1	Academic Competency	.31**	.39**	.23**	.03	.09*	.09*	.04	.10**	.01	.05	.02	.02
secCY2	Behavioural Conduct Competency	.37**	.26**	.18**	.43**	.30**	.46**	.33**	.33**	.32**	.26**	.30**	.33**
secCY3	Sports & Physical Appearance	.36**	-.01	.06	.29**	.11**	.42**	.23**	.25**	.30**	.25**	.18**	.27**
secCY4	Social Competency	.58**	.20	.13	.09*	.16**	.05	.06	-.03	.04	-.11**	.04	.01

Note: Correlations were calculated using all available data, excluding cases pairwise to achieve the largest possible sample sizes for comparison. Sample sizes vary from 523 to 778 for the various correlations. Educ asps–Educational aspirations. Occup asps–Occupational aspirations. Mot 1–Independent Mastery; Mot 2–Internal Criteria for Success; Mot 3–Preference for Challenge.
*Correlation is significant at $p < .05$. **Correlation is significant at $p < .01$.

Appendix B.7 Regression Model Summary Results

Table B.7.1 Hierarchical regression comparing the viability of the various self-perception structures for predicting self-esteem (N = 689)

	Set / Structure	Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	8.18***	5, 683		.049			5.363	
	Prior academic performance[b]	2	5.52***	8, 680	0.69	.048	-.001	.5479	5.366	+0.003
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	14.78***	17, 671	22.26	.241	.193	< .00008	4.792	-0.574
2	Self-Efficacy (1)	3	15.96***	15, 673	27.46	.231	.183	< .00008	4.824	-0.542
3	Self-Efficacy (2)	3	20.42***	10, 678	76.75	.203	.155	< .00008	4.909	-0.457
4	SPPA	3	67.85***	16, 676	118.80	.545	.497	< .00008	3.711	-1.655
5	Self-Concept (1)	3	61.34***	16, 672	105.98	.522	.474	< .00008	3.801	-1.565
6	Self-Concept (2)	3	63.98***	11, 677	198.26	.435	.387	< .00008	4.134	-1.232
7	Self-Esteem	-	-	-	-	-	-	-	-	-
8	Competency (1)	3	54.68***	18, 670	86.82	.525	.477	< .00008	3.789	-1.577
9	Competency (2)	3	51.50***	12, 676	137.35	.424	.376	< .00008	4.175	-1.191
10	MSPSE / SPPA	3	44.97***	25, 663	58.31	.550^	.502^	< .00008	3.691†	-1.675†
11	Self-Efficacy (1) / Self-Concept (1)	3	42.59***	23, 665	56.82	.524	.476	< .00008	3.793	-1.573
12	Self-Efficacy (2) / Self-Concept (2)	3	56.72***	13, 675	128.16	.446	.398	< .00008	4.092	-1.274

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.
[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.
[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.
[c]*Structures*: (1) = First-Order; (2) = Second-Order.
[d]Root mean square error.
***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).
^Indicates the model/structure that explains the most variance.
†Indicates the model/structure that has the least error.

Table B.7.2 Hierarchical regression comparing the viability of the various self-perception structures for predicting educational aspirations (N = 677)

Set / Structure		Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	5.18**	5, 671		.030			1.135	
	Prior academic performance[b]	2	26.58***	8, 668	54.56	.205	.175	< .00008	1.027	-0.108
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	19.10***	17, 659	6.78	.271	.066	< .00008	0.984	-0.043
2	Self-Efficacy (1)	3	20.69***	15, 661	6.95	.261	.056	< .00008	0.990	-0.037
3	Self-Efficacy (2)	3	27.11***	10, 666	17.80	.252	.047	< .00008	0.996	-0.031
4	SPPA	3	17.68***	16, 660	4.42	.245	.040	< .00008	1.001	-0.026
5	Self-Concept (1)	3	17.69***	16, 660	4.51	.244	.039	< .00008	1.001	-0.026
6	Self-Concept (2)	3	25.05***	11, 665	10.13	.243	.038	< .00008	1.002	-0.025
7	Self-Esteem	3	23.86***	9, 667	1.45	.206	.001	.1998	1.026	-0.001
8	Competency (1)	3	18.37***	18, 658	5.98	.272	.067	< .00008	0.983	-0.044
9	Competency (2)	3	25.37***	12, 664	13.10	.270	.065	< .00008	0.984	-0.043
10	MSPSE / SPPA	3	14.04***	25, 651	4.34	.279^	.074^	< .00008	0.978[†]	-0.049[†]
11	Self-Efficacy (1) / Self-Concept (1)	3	14.60***	23, 653	4.10	.269	.064	< .00008	0.985	-0.042
12	Self-Efficacy (2) / Self-Concept (2)	3	22.83***	13, 663	10.09	.266	.061	< .00008	0.987	-0.040

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

**Model significant at p < .0008 (equivalent to a pre-Bonferroni criterion of p < .01). ***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

[†]Indicates the model/structure that has the least error.

Table B.7.3 Hierarchical regression comparing the viability of the various self-perception structures for predicting occupational aspirations (N = 579)

	Set / Structure	Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Control [a]	1	1.31	5, 573		.002			1.700	
	Prior academic performance[b]	2	8.60***	8, 570	20.16	.095	.083	< .0008	1.619	-0.081
	Structure[c]				(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	6.26***	17, 561	3.35	.134^	.039^	< .0008	1.584[†]	-0.035[†]
2	Self-Efficacy (1)	3	6.20***	15, 563	2.88	.119	.024	.0059	1.597	-0.022
3	Self-Efficacy (2)	3	7.92***	10, 568	6.06	.114	.019	< .0042	1.602	-0.017
4	SPPA	3	5.75***	16, 562	2.03	.109	.014	.0410	1.607	-0.012
5	Self-Concept (1)	3	5.68***	16, 562	1.89	.108	.013	.0590	1.608	-0.011
6	Self-Concept (2)	3	7.80***	11, 567	3.46	.108	.013	.0162	1.607	-0.012
7	Self-Esteem	3	8.02***	9, 569	0.85	.095	.000	.3564	1.619	-0.000
8	Competency (1)	3	5.90***	18, 560	2.53	.126	.031	.0055	1.591	-0.028
9	Competency (2)	3	7.38***	12, 566	4.62	.120	.025	< .0042	1.597	-0.022
10	MSPSE / SPPA	3	4.74***	25, 553	2.22	.134^	.039^	< .0042	1.584[†]	-0.035[†]
11	Self-Efficacy (1) / Self-Concept (1)	3	4.65***	23, 555	1.81	.118	.023	.0308	1.598	-0.021
12	Self-Efficacy (2) / Self-Concept (2)	3	6.55***	13, 565	3.01	.114	.019	.0108	1.602	-0.017

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

[†]Indicates the model/structure that has the least error.

Table B.7.4 Hierarchical regression comparing the viability of the various self-perception structures for predicting Independent Mastery Motivation (N = 521)

Set / Structure		Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Control [a]	1	3.34	5, 515		.022			0.662	
	Prior academic performance[b]	2	9.44***	8, 512	15.53	.100	.078	< .00008	0.635	-0.027
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	12.81***	17, 503	14.43	.247	.147	< .00008	0.581	-0.054
2	Self-Efficacy (1)	3	13.10***	15, 505	17.35	.246	.146	< .00008	0.581	-0.054
3	Self-Efficacy (2)	3	16.58***	10, 510	43.95	.217	.117	< .00008	0.592	-0.043
4	SPPA	3	10.38***	16, 504	9.97	.198	.098	< .00008	0.599	-0.036
5	Self-Concept (1)	3	10.73***	16, 504	10.69	.201	.101	< .00008	0.599	-0.036
6	Self-Concept (2)	3	14.26***	11, 509	25.15	.199	.099	< .00008	0.599	-0.036
7	Self-Esteem	3	9.89***	9, 511	9.36	.116	.016	.0023	0.630	-0.005
8	Competency (1)	3	13.53***	18, 502	16.12	.272^	.172^	< .00008	0.571[†]	-0.064[†]
9	Competency (2)	3	10.49***	12, 508	33.77	.263	.163	< .00008	0.575	-0.060
10	MSPSE / SPPA	3	10.49***	25, 495	10.07	.268	.168	< .00008	0.573	-0.062
11	Self-Efficacy (1) / Self-Concept (1)	3	10.97***	23, 497	11.19	.268	.168	< .00008	0.573	-0.062
12	Self-Efficacy (2) / Self-Concept (2)	3	15.94***	13, 507	25.65	.252	.152	< .00008	0.579	-0.056

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

[†]Indicates the model/structure that has the least error.

Table B.7.5 Hierarchical regression comparing the viability of the various self-perception structures for predicting Internal Criteria for Success Motivation (N = 521)

Set / Structure		Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	3.15	5, 515		.021			0.802	
	Prior academic performance[b]	2	8.68***	8, 512	15.51	.092	.071	< .00008	0.772	-0.030
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	5.89***	17, 503	3.53	.134	.042	< .0042	0.754	-0.018
2	Self-Efficacy (1)	3	6.87***	15, 505	4.34	.134	.042	< .0008	0.754	-0.018
3	Self-Efficacy (2)	3	9.08***	10, 510	10.67	.124	.032	< .00008	0.758	-0.014
4	SPPA	3	6.96***	16, 504	4.19	.138	.046	< .0008	0.752	-0.020
5	Self-Concept (1)	3	6.90***	16, 504	4.12	.136	.044	< .0008	0.753	-0.019
6	Self-Concept (2)	3	8.67***	11, 509	6.70	.125	.033	< .0008	0.758	-0.014
7	Self-Esteem	3	8.34***	9, 511	4.88	.099	.007	.0276	0.769	-0.003
8	Competency (1)	3	5.79***	18, 502	3.43	.141	.049	< .0008	0.751	-0.021
9	Competency (2)	3	8.54***	12, 508	7.82	.144	.052	< .00008	0.750	-0.022
10	MSPSE / SPPA	3	4.93***	25, 495	2.80	.145^	.053^	< .0008	0.749†	-0.023†
11	Self-Efficacy (1) / Self-Concept (1)	3	5.37***	23, 497	3.05	.145^	.053^	< .0008	0.749†	-0.023†
12	Self-Efficacy (2) / Self-Concept (2)	3	7.69***	13, 507	5.24	.131	.039	< .0008	0.756	-0.016

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

†Indicates the model/structure that has the least error.

Table B.7.6 Hierarchical regression comparing the viability of the various self-perception structures for predicting <u>Preference for Challenge Motivation</u> (N = 521)

Set / Structure		Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		**(Step 1 to 2)**			**(Step 1 to 2)**
	Controls[a]	1	0.61	5, 515		.005			0.685	
	Prior academic performance[b]	2	3.60**	8, 512	8.34	.033	.028	< .00008	0.671	-0.014
Structure[c]					**(Step 2 to 3)**		**(Step 2 to 3)**			**(Step 2 to 3)**
1	MSPSE	3	14.53***	17, 503	21.69	.290	.257	< .00008	0.573	-0.098
2	Self-Efficacy (1)	3	14.13***	15, 505	24.71	.272	.239	< .00008	0.583	-0.088
3	Self-Efficacy (2)	3	15.99***	10, 510	62.71	.229	.196	< .00008	0.600	-0.071
4	SPPA	3	9.89***	16, 504	13.50	.187	.154	< .00008	0.616	-0.055
5	Self-Concept (1)	3	9.96***	16, 504	14.13	.182	.149	< .00008	0.618	-0.053
6	Self-Concept (2)	3	11.71***	11, 509	31.68	.174	.141	< .00008	0.621	-0.050
7	Self-Esteem	3	3.54**	9, 511	3.41	.038	.005	.0652	0.670	-0.001
8	Competency (1)	3	13.49***	18, 502	20.28	.295	.259	< .00008	0.574	-0.097
9	Competency (2)	3	17.44***	12, 508	42.19	.262	.229	< .00008	0.587	-0.084
10	MSPSE / SPPA	3	11.86***	25, 495	14.27	325^	.292^	< .00008	0.561†	-0.110†
11	Self-Efficacy (1) / Self-Concept (1)	3	12.04***	23, 497	15.32	.301	.268	< .00008	0.571	-0.100
12	Self-Efficacy (2) / Self-Concept (2)	3	15.90***	13, 507	33.94	.256	.223	< .00008	0.589	-0.082

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

**Model significant at p < .0008 (equivalent to a pre-Bonferroni criterion of p < .01). ***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

†Indicates the model/structure that has the least error.

Table B.7.7 Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE Mathematics (N = 427; control sample only)

	Set / Structure	Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	6.42***	5, 421		.076			1.604	
	Prior academic performance[b]	2	167.74***	8, 418	260.83	.658	.582	< .00008	0.976	-0.628
	Structure[c]				(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	87.64***	17, 409	2.50	.683	.025	< .0042	0.941	-0.035
2	Self-Efficacy (1)	3	103.93***	15, 411	3.79	.680	.022	< .0008	0.944	-0.032
3	Self-Efficacy (2)	3	149.14***	10, 416	7.15	.673	.015	< .0042	0.954	-0.022
4	SPPA	3	105.41***	16, 410	1.35	.668	.010	.2148	0.962	-0.014
5	Self-Concept (1)	3	104.56***	16, 410	1.51	.668	.010	.1518	0.961	-0.015
6	Self-Concept (2)	3	145.42***	11, 415	2.91	.671	.013	.0344	0.957	-0.019
7	Self-Esteem	3	167.04***	9, 417	3.80	.661	.003	.0520	0.971	-0.005
8	Competency (1)	3	97.03***	18, 408	3.16	.679	.021	< .0042	0.946	-0.030
9	Competency (2)	3	133.25***	12, 414	2.38	.670	.011	.0514	0.959	-0.017
10	MSPSE / SPPA	3	63.72***	25, 401	2.00	.684^	.026^	.0104	0.938†	-0.038†
11	Self-Efficacy (1) / Self-Concept (1)	3	74.46***	23, 403	2.53	.678	.020	< .0042	0.947	-0.029
12	Self-Efficacy (2) / Self-Concept (2)	3	122.24***	13, 413	3.77	.675	.017	< .0042	0.951	-0.025

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

†Indicates the model/structure that has the least error.

Table B.7.8 Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE English (N = 421; control sample only)

	Set / Structure	Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	6.13***	5, 415		.062			1.339	
	Prior academic performance[b]	2	123.42***	8, 412	273.78	.689	.627	< .00008	0.770	-0.569
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	63.42***	17, 403	2.46	.702	.013	.0097	0.754	-0.016
2	Self-Efficacy (1)	3	67.69***	15, 405	2.79	.701	.012	.0076	0.756	-0.014
3	Self-Efficacy (2)	3	100.75***	10, 410	6.81	.699	.010	< .0042	0.759	-0.011
4	SPPA	3	66.54***	16, 404	2.31	.698	.009	.0197	0.759	-0.011
5	Self-Concept (1)	3	68.04***	16, 404	2.60	.701	.012	.0088	0.756	-0.014
6	Self-Concept (2)	3	93.26***	11, 409	3.69	.697	.008	.0120	0.761	-0.009
7	Self-Esteem	3	109.50***	9, 411	0.97	.690	.001	.3260	0.770	-0.000
8	Competency (1)	3	59.46***	18, 402	2.89	.706^	.017^	< .0042	0.750†	-0.020†
9	Competency (2)	3	85.10***	12, 408	3.47	.699	.010	.0083	0.761	-0.009
10	MSPSE / SPPA	3	45.42***	25, 395	1.96	.703	.014	.0127	0.754	-0.016
11	Self-Efficacy (1) / Self-Concept (1)	3	48.85***	23, 397	2.19	.705	.016	.0062	0.751	-0.019
12	Self-Efficacy (2) / Self-Concept (2)	3	79.10***	13, 407	3.18	.699	.010	.0080	0.759	-0.011

Note: Bonferonni corrections have been applied to the criterion for significance such that p < .0042 is equivalent to a pre-Bonferroni criterion of p < .05; p < .0008 is equivalent to a pre-Bonferroni criterion of p < .01; and p < .00008 is equivalent to a pre-Bonferroni criterion of p < .001. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at p < .00008 (equivalent to a pre-Bonferroni criterion of p < .001).

^Indicates the model/structure that explains the most variance.

†Indicates the model/structure that has the least error.

Table B.7.9 Hierarchical regression comparing the viability of the various self-perception structures for predicting GCSE Science (N = 433; control sample only)

Set / Structure		Step	F	F df	F change	Adj. R^2	Adj. R^2 change	F change prob.	RMSE[d]	RMSE[d] change
					(Step 1 to 2)		(Step 1 to 2)			(Step 1 to 2)
	Controls[a]	1	7.18***	5, 427		.076			1.586	
	Prior academic performance[b]	2	93.87***	8, 424	153.16	.603	.527	< .00008	1.039	-0.547
Structure[c]					(Step 2 to 3)		(Step 2 to 3)			(Step 2 to 3)
1	MSPSE	3	55.48***	17, 415	5.28	.653	.050	< .00008	0.971	-0.068
2	Self-Efficacy (1)	3	61.19***	15, 417	6.74	.652	.049	< .00008	0.973	-0.066
3	Self-Efficacy (2)	3	79.02***	10, 422	17.61	.642	.039	< .00008	0.987	-0.052
4	SPPA	3	55.26***	16, 416	5.82	.639	.036	< .00008	0.991	-0.048
5	Self-Concept (1)	3	55.31***	16, 416	6.41	.641	.038	< .00008	0.988	-0.051
6	Self-Concept (2)	3	75.56***	11, 421	12.85	.641	.038	< .00008	0.989	-0.050
7	Self-Esteem	3	83.39***	9, 423	5.69	.609	.006	.0175	1.032	-0.007
8	Competency (1)	3	58.69***	18, 414	6.56	.665^	.062^	< .00008	0.955[†]	-0.084[†]
9	Competency (2)	3	67.95***	12, 420	10.13	.641	.038	< .00008	0.989	-0.050
10	MSPSE / SPPA	3	42.46***	25, 407	4.22	.662	.059	< .00008	0.959	-0.080
11	Self-Efficacy (1) / Self-Concept (1)	3	45.84***	23, 409	4.92	.660	.057	< .00008	0.962	-0.077
12	Self-Efficacy (2) / Self-Concept (2)	3	64.29***	13, 419	10.19	.653	.050	< .00008	0.972	-0.067

Note: Bonferonni corrections have been applied to the criterion for significance such that $p < .0042$ is equivalent to a pre-Bonferroni criterion of $p < .05$; $p < .0008$ is equivalent to a pre-Bonferroni criterion of $p < .01$; and $p < .00008$ is equivalent to a pre-Bonferroni criterion of $p < .001$. F change probabilities over .0042 are therefore not significant.

[a]*Controls*: Gender (male); Free school meals; Special educational needs; Low ACORN score; High ACORN score. ACORN–'A Classification of Residential Neighbourhoods' socio-economic indicator.

[b]*Prior academic performance variables*: KS3 Mathematics; KS3 English; KS3 Science.

[c]*Structures*: (1) = First-Order; (2) = Second-Order.

[d]Root mean square error.

***Model significant at $p < .00008$ (equivalent to a pre-Bonferroni criterion of $p < .001$).

^Indicates the model/structure that explains the most variance.

[†]Indicates the model/structure that has the least error.

Appendix B.8 Regression Coefficients and Standard Errors

Table B.8.1 Unstandardised (B) and standardised (beta; β) coefficients, with robust standard errors, showing which self-perception factors predict which outcomes (standardised coefficients in parentheses; robust standard errors in italics)

Step / Structure	Outcomes								
	Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
Step 1: Controls									
Gender (male)	2.15 (.19) .40**	-.10 (.05) .09	.29 (.08) .14	.22 (.16) .06**	.21 (.13) .07*	.00 (.00) .06	.16 (.05) .16	-.28 (-.10) .13	.27 (.08) .15
Free school meals	-.54 (-.04) .54	-.07 (-.03) .12	.14 (.03) .19	-.06 (-.04) .08	-.17 (-.08) .09	.01 (.01) .08	-.41 (-.10) .21	-.37 (-.10) .16	-.52 (-.12) .21
Special educational needs	-1.89 (-.11) .68	-.40 (-.11) .16	-.09 (-.02) .23	-.16 (-.07) .10	-.15 (-.06) .12	-.13 (-.06) .09	-1.39 (-.20) .39**	-.96 (-.16) .32*	-1.18 (-.18) .34*
Low ACORN	-.60 (-.05) .48	-.20 (-.08) .10	-.06 (-.02) .17	.00 (.00) .07	-.04 (-.02) .08	.04 (.03) .07	-.64 (-.17) .19*	-.33 (-.11) .15	-.42 (-.11) .18
High ACORN	.50 (.03) .57	.30 (.09) .11*	.26 (.05) .20	.01 (.01) .08	.05 (.02) .12	.08 (.04) .09	-.10 (-.02) .25	.27 (.07) .20	.26 (.05) .22
Constant	20.77 (-) .37	4.08 (-) .07**	5.84 (-) .12	2.64 (-) .05	2.52 (-) .06**	2.71 (-) .05**	4.42 (-) .13**	4.90 (-) .11**	4.34 (-) .14**
Step 2: Controls plus prior academic performance									
Gender (male)	2.12 (.19) .43**	-.15 (-.07) .08	.34 (.10) .14	.17 (.13) .06*	.19 (.12) .07	.01 (.01) .06	-.07 (-.02) .09	-.30 (-.11) .08**	.02 (.01) .10
Free school meals	-.45 (-.03) .54	.09 (.03) .11	.30 (.07) .18	-.01 (-.01) .08	-.11 (-.05) .01	.06 (.03) .08	-.06 (-.01) .14	-.04 (-.01) .12	-.11 (-.03) .15
Special educational needs	-1.64 (-.09) .71	.09 (.02) .15	.46 (.08) .22	.04 (.02) .10	.09 (.03) .13	.02 (.01) .10	-.05 (-.01) .21	-.18 (-.03) .16	-.02 (-.00) .19
Low ACORN	-.53 (-.04) .48	-.13 (-.05) .09	.02 (.00) .16	.06 (.04) .07	.01 (.01) .08	.08 (.05) .07	-.46 (-.12) .13**	-.12 (-.04) .10	-.21 (-.06) .13
High ACORN	.45 (.03) .58	.17 (.05) .11	.13 (.03) .19	-.01 (-.01) .08	.03 (.01) .11	.08 (.04) .09	-.14 (-.03) .15	.25 (.06) .10	.20 (.04) .13

Table continued over the page…

Step / Structure	Outcomes								
	Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
KS3 Mathematics	-.17 (-.04) *.32*	.15 (.16) *.07*	.02 (.02) *.10*	.13 (.22) *.05*	.14 (.21) *.05**	-.03 (-.04) *.05*	1.01 (.66) *.07***	.18 (.14) *.07*	.23 (.16) *.08**
KS3 English	.06 (.01) *.34*	.11 (.09) *.06*	.31 (.19) *.11**	-.00 (-.01) *.04*	.07 (.09) *.05*	.07 (.10) *.05*	.19 (.12) *.09*	.66 (.48) *.07***	.11 (.07) *.09*
KS3 Science	.41 (.08) *.45*	.27 (.24) *.09**	.27 (.16) *.14*	.07 (.11) *.06*	.02 (.02) *.07*	.11 (.17) *.06*	.09 (.06) *.13*	.37 (.26) *.08***	.94 (.57) *.11***
Constant	19.15 (-) *1.32***	1.11 (-) *.26***	2.45 (-) *.47*	1.51 (-) *.19*	1.15 (-) *.22***	1.81 (-) *.19***	-3.10 (-) *.29***	-1.96 (-) *.25*	-2.90 (-) *.34***
Step 3: Adding self-perception structures									
MSPSE									
Gender (male)	1.95 (.18) *.38***	-.22 (-.09) *.08*	.22 (.06) *.14*	.11 (.08) *.06*	.15 (.09) *.07*	-.02 (-.02) *.05*	-.09 (-.03) *.09*	-.30 (-.11) *.08***	-.03 (-.01) *.10*
Free school meals	-.57 (-.04) *.49*	.06 (.02) *.11*	.23 (.05) *.18*	-.08 (-.04) *.07*	-.15 (-.07) *.09*	-.00 (-.00) *.07*	-.11 (-.03) *.13*	-.08 (-.02) *.12*	-.17 (-.04) *.14*
Special educational needs	-1.01 (-.06) *.63*	.08 (.02) *.15*	.48 (.09) *.23*	.05 (.02) *.10*	.13 (.05) *.13*	.02 (.01) *.11*	.00 (.00) *.20*	-.15 (-.02) *.15*	.07 (.01) *.20*
Low ACORN	-.31 (-.03) *.44*	-.12 (-.05) *.09*	.05 (.01) *.16*	.05 (.03) *.06*	.01 (.00) *.08*	.07 (.04) *.06*	-.42 (-.11) *.12**	-.11 (-.04) *.09*	-.20 (-.05) *.12*
High ACORN	.43 (.03) *.50*	.14 (.04) *.10*	.08 (.02) *.18*	-.08 (-.04) *.07*	.01 (.00) *.10*	-.02 (-.01) *.08*	-.17 (-.04) *.15*	.24 (.06) *.10*	.11 (.02) *.13*
KS3 Mathematics	-.00 (-.00) *.28*	.14 (.15) *.06*	.02 (.01) *.12*	.11 (.19) *.04*	.12 (.17) .05	-.03 (-.05) *.04*	1.02 (.67) *.07***	.18 (.14) *.07*	.29 (.20) *.08***
KS3 English	-.32 (-.06) *.30*	.11 (.09) *.06*	.32 (.19) *.11**	-.02 (-.04) *.04*	.06 (.08) *.05*	.03 (.05) *.04*	.21 (.13) 08	.64 (.47) *.06***	.09 (.06) *.08*
KS3 Science	-.06 (-.01) *.39*	.18 (.16) *.08*	.13 (.08) *.14*	.03 (.05) *.06*	.01 (.02) *.07*	-.06 (.09) *.05*	.16 (.01) *.13*	.33 (.23) *.08***	.82 (.50) *.10***
B1 Self-Efficacy in Enlisting Social Resources	.08 (.06) *.07*	-.03 (-.10) *.01*	-.09 (-.19) *.03**	-.02 (-.14) *.01*	-.01 (-.04) *.01*	-.01 (-.08) *.01*	-.05 (-.11) *.02*	-.01 (-.02) *.01*	-.04 (-.10) *.02*
B2 Self-Efficacy for Academic Achievement	-.01 (-.01) *.08*	.06 (.19) *.02***	.08 (.18) *.03*	.04 (.20) *.01**	.03 (.12) *.02*	.03 (.17) *.01**	.01 (.02) *.02*	.01 (.02) *.02*	-.02 (-.05) *.02*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
B3	Self-Efficacy for Self-Regulated Learning	.03 (.02) *.08*	.03 (.12) *.01*	-.02 (.04) *,03*	.05 (.26) *.01***	.02 (.12) *.01*	.08 (.44) *.01***	.05 (.12) *.02*	.03 (.09) *.02*	.09 (.23) *.02***
B4	Self-Efficacy for Leisure-Time Skills & Extracurricular Activities	-.00 (-.00) *.06*	-.01 (-.04) *.01*	.01 (.03) *.02*	.00 (.00) *.01*	.00 (.00) *.01*	-.01 (-.08) *.01*	-.01 (-.03) *.02*	-.02 (-.05) *.01*	-.03 (-.07) *.01*
B5	Self-Regulatory Efficacy	.05 (.04) *.06*	-.01 (-.03) *.01*	.02 (.05) *.02*	.00 (.02) *.01*	-.01 (-.06) *.01*	.02 (.13) *.01**	-.01 (-.01) *.01*	.00 (.01) *.01*	.02 (.06) *.01*
B6	Self-Efficacy to Meet Others' Expectations	.29 (.25) *.07***	.03 (.10) *.01*	.03 (.09) *.02*	.00 (.03) *.01*	-.01 (-.08) *.01*	.00 (.01) *.01*	.03 (.09) *.02*	.01 (.03) *.01*	.04 (.10) *.02*
B7	Social Self-Efficacy	.08 (.05) *.08*	.00 (.01) *.01*	.02 (.03) *.03*	-.01 (-.07) *.01*	.01 (.03) *.01*	-.01 (-.06) *.01*	.04 (.09) *.02*	.03 (.09) *.01*	.00 (.00) *.02*
B8	Self-Assertive Efficacy	.18 (.15) *.06**	-.01 (-.05) *.01*	.00 (.01) *.02*	.01 (.07) *.01*	.02 (.10) *.01*	-.00 (-.00) 01	-.04 (-.11) *.01*	-.00 (-.01) *.01*	-.01 (-.03) *.02*
B9	Self-Efficacy for Parental & Community Support	.07 (.06) *.05*	.01 (.02) *.01*	.01 (.02) *.02*	.00 (.02) *.01*	.01 (.04) *.01*	-.01 (-.04) *.01*	.01 (.04) *.01*	-.00 (-.01) *.01*	.01 (.03) *.01*
Constant		7.29 (-) *1.70***	.45 (-) *.39*	1.87 (-) *.70*	.65 (-) *.24*	.37 (-) *.34*	.64 (-) *.26*	-3.50 (-) *.41***	-2.72 (-) .35**	-3.37 (-) *.45***
Self-Efficacy (First-Order)										
Gender (male)		1.42 (.13) *.41**	-.15 (-.07) *.09*	.35 (.10) *.15*	.15 (.11) *.06*	.17 (.11) *.08*	.01 (.01) *.06*	-.17 (-.05) *.09*	-.32 (-.12) *.09***	-.08 (-.02) *.10*
Free school meals		-.60 (-.04) *.49*	.08 (.03) *.11*	.31 (.07) *.18*	-.05 (-.03) *.07*	-.13 (-.06) *.09*	.01 (.00) *.07*	-.05 (-.01) *.13*	-.07 (-.02) *.12*	-.11 (-.03) *.14*
Special educational needs		-.82 (-.05) *.63*	.06 (.01) *.15*	.43 (.08) *.22*	.03 (.01) *.10*	.13 (.05) *.13*	.02 (.01) *.11*	-.11 (-.02) *.21*	-.13 (-.02) *.15*	.01 (.00) *.20*
Low ACORN		-.36 (-.03) *.44*	-.12 (-.05) *.09*	.04 (.01) *.16*	.05 (.04) *.06*	.01 (.01) *.08*	.08 (.05) *.06*	-.46 (-.12) *.13***	-.12 (-.04) *.10*	-.22 (-.06) *.12*
High ACORN		.33 (.02) *.50*	.16 (.05) *.10*	.15 (.03) *.18*	-.06 (-.03) *.07*	.02 (.01) *.10*	-.01 (-.01) *.08*	-.14 (-.03) *.15*	.20 (.05) *.10*	.14 (.03) *.13*
KS3 Mathematics		-.15 (-.03) *.31*	.12 (.13) *.07*	-.00 (-.00) *.11*	.09 (.16) *.04*	.12 (.17) *.05*	-.04 (-.06) *.04*	.99 (.65) *.07***	.19 (.15) *.07*	.25 (.17) *.08**
KS3 English		-.15 (-.03) *.31*	.11 (.10) *.06*	.33 (.19) *.11*	-.01 (-.02) *.04*	.06 (.07) *.05*	.05 (.07) *.04*	.24 (.15) *.09*	.63 (.46) *.07***	.13 (.08) *.08*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
	KS3 Science	.05 (.01) *.40*	.19 (.17) *.09*	.13 (.08) *.15*	.03 (.04) *.05*	.01 (.02) *.07*	.06 (.09) *.05*	-.02 (-.01) *.13*	.36 (.25) *.08***	.81 (.50) *.10***
SF1	Self-Efficacy for Self-Regulated Learning	.11 (.09) *.07*	.03 (.10) *.01*	-.02 (-.06) *.02*	.04 (.24) *.01***	.02 (.08) *.01*	.07 (.43) *.01***	.03 (.08) *.02*	.04 (.13) *.01*	.08 (.22) *.02***
SF2	Self-Regulatory Efficacy for Good Conduct	.07 (.06) *.05*	.00 (.00) *.01*	.03 (.08) *.02*	.00 (.01) *.01*	-.01 (-.06) *.01*	.02 (.12) *.01*	-.00 (-.00) *.01*	.01 (.02) *.01*	.02 (.06) *.01*
SF3	Self-Assertive Efficacy	.28 (.21) *.06***	-.01 (-.02) *.01*	-.00 (.-.01) *.02*	.00 (.02) *.01*	.03 (.15) *.01*	-.00 (-.02) *.01*	-.03 (-.07) *.02*	.02 (.05) *.01*	-.02 (-.05) *.02*
SF4	Sports Self-Efficacy	.08 (.09) *.04*	-.01 (-.04) *.01*	-.00 (-.01) *.02*	-.00 (-.03) *.01*	-.00 (-.02) *.01*	-.00 (-.03) *.01*	.02 (.05) *.01*	.00 (.00) *.01*	.01 (.03) *.01*
SF5	Communication/Performing Arts Self-Efficacy	-.14 (-.11) *.06*	.02 (.05) *.01*	.03 (.07) *.02*	.01 (.04) *.01*	.01 (.05) *.02*	-.00 (-.03) *.01*	-.05 (-.11) *.02**	-.01 (-.04) *.01*	-.06 (-.15) *.02***
SF6	Social Self-Regulatory Efficacy	.26 (.19) *.07***	-.00 (-.01) *.01*	-.01 (-.03) *.02*	-.01 (-.06) *.01*	-.00 (-.02) *.01*	-.01 (-.08) *.01*	.02 (.05) *.01*	.00 (-.01) *.01*	.01 (.02) *.02*
SF7	Mathematics/Science Self-Efficacy	.07 (.05) *.07*	.05 (.18) *.02**	.07 (.18) *.03*	.04 (.23) *.01***	.01 (-.07) *.01*	.02 (.13) *.01*	.05 (.13) *.02*	-.01 (-.04) *.01*	.02 (.06) *.02*
	Constant	7.51 (-) *1.61***	.32 (-) *.35*	1.47 (-) *.64*	.55 (-) *.24*	.37 (-) *.30*	.56 (-) *.26*	-3.44 (-) *.40***	-2.67 (-) *.34***	-3.69 (-) *.42***
Self-Efficacy (Second-Order)										
	Gender (male)	1.82 (.16) *.40***	-.17 (-.07) *.08*	.33 (.09) *.14*	.15 (.11) *.05*	.16 (.10) *.07*	-.01 (-.00) *.05*	-.06 (-.02) *.09*	-.30 (-.11) *.08***	.04 (.01) *.10*
	Free school meals	-.53 (-.04) *.51*	.08 (.03) *.11*	.28 (.06) *.18*	-.06 (-.04) *.07*	-.14 (-.07) *.09*	-.01 (-.01) *.07*	-.08 (-.02) *.13*	-.07 (-.02) *.12*	-.14 (-.03) *.14*
	Special educational needs	-1.30 (-.07) *.63*	.11 (.03) *.15*	.50 (.09) *.22*	.07 (.03) *.10*	.13 (.05) *.13*	.04 (.02) *.10*	-.04 (-.01) *.21*	-.18 (-.03) *.15*	-.02 (-.00) *.20*
	Low ACORN	-.38 (-.03) *.45*	-.11 (-.04) *.09*	.06 (.02) *.16*	.08 (.05) *.06*	.03 (.02) *.08*	.10 (.07) *.06*	-.45 (-.12) *.13***	-.12 (-.04) *.10*	-.22 (-.06) *.12*
	High ACORN	.33 (.02) *.51*	.15 (.05) *.10*	.12 (.02) *.18*	-.04 (-.02) *.07*	.03 (.01) *.11*	.03 (.02) *.08*	-.17 (-.04) *.15*	.24 (.06) *.09*	.16 (.03) *.13*
	KS3 Mathematics	-.19 (-.04) *.28*	.16 (.17) *.07*	.03 (.02) *.11*	.13 (.22) *.04**	.14 (.20) *.05*	-.02 (-.03) *.04*	1.01 (.67) *.07***	.18 (.14) *.07*	.25 (.17) *.08**

Table continued over the page…

Step / Structure		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
		Outcomes								
	KS3 English	-.10 (-.02) *.31*	.08 (.07) *.06*	.30 (.18) *.11*	-.03 (-.05) *.04*	.06 (.07) *.05*	.03 (.05) *.04*	.19 (.12) *.08*	.65 (.47) *.06***	.10 (.06) *.08*
	KS3 Science	-.02 (-.00) *.40*	.20 (.18) *.09*	.20 (.12) *.14*	.03 (.05) *.06*	.01 (.01) *.07*	.06 (.09) *.05*	.02 (.01) *.12*	.33 (.23) *.08***	.82 (.50) *.10***
secSF1	Academic & Self-Management Efficacy	.44 (.27) *.07***	.08 (.23) *.02***	.07 (.14) *.03*	.07 (.33) *.01***	.02 (.07) *.01*	.10 (.49) *.01***	.07 (.16) *.02***	.04 (.10) *.02*	.12 (.25) *.02***
secSF2	Social Self-Efficacy	.28 (.19) *.07***	.00 (.00) *.01*	.01 (.02) *.02*	.01 (.04) *.01*	.03 (.15) *.01**	-.01 (-.05) *.01*	-.02 (-.04) *.02*	.01 (.02) *.01*	-.04 (-.09) *.02*
	Constant	8.60 (-) *1.53***	.01 (-) *.33*	1.25 (-) *.61*	.30 (-) *.24*	.28 (-) *.30*	.40 (-) *.26*	-3.79 (-) *.34***	-2.59 (-) *.30***	-3.83 (-) *.40***
SPPA										
	Gender (male)	-.18 (-.02) *.33*	-.11 (-.05) *.09*	.31 (.09) *.16*	.17 (.12) *.06*	.11 (.06) *.08*	.02 (.01) *.06*	-.11 (-.03) *.11*	-.31 (-.11) *.09**	-.09 (-.03) *.12*
	Free school meals	-.40 (-.03) *.36*	.10 (.03) *.11*	.34 (.08) *.18*	-.02 (-.01) *.07*	-.12 (-.05) *.09*	.05 (.03) *.07*	-.08 (-.02) *.13*	-.08 (-.02) *.12*	-.16 (-.04) *.14*
	Special educational needs	-.62 (-.03) *.45*	.12 (.03) *.15*	.53 (.09) *.22*	.08 (.03) *.10*	.18 (.07) *.13*	.02 (.01) *.09*	-.01 (-.00) *.20*	-.11 (-.02) *.16*	.01 (.00) *.20*
	Low ACORN	-.32 (-.03) *.33*	-.15 (-.06) *.09*	.01 (.00) *.16*	.04 (.03) *.06*	.01 (.01) *.07*	.06 (.04) *.07*	-.46 (-.12) *.13***	-.12 (-.04) *.10*	-.21 (-.06) *.12*
	High ACORN	-.16 (-.01) *.41*	.11 (.03) *.11*	.07 (.01) *.19*	-.09 (-.04) *.08*	-.01 (-.00) *.11*	-.04 (-.02) *.09*	-.19 (-.04) *.15*	.24 (.06) *.09*	.16 (.03) *.13*
	KS3 Mathematics	-.34 (-.07) *.22*	.15 (.15) *.06*	.01 (.01) *.11*	.10 (.18) *.04*	.12 (.18) *.05*	-.05 (-.08) *.04*	.99 (.65) *.08***	.15 (.12) *.07*	.21 (.14) *.08*
	KS3 English	-.26 (-.05) *.23*	.08 (.07) *.06*	.31 (.18) *.11*	-.04 (-.07) *.04*	.05 (.06) *.05*	.03 (.04) *.04*	.19 (.11) *.09*	.66 (.48) *.06***	.10 (.06) *.08*
	KS3 Science	.50 (.09) *.30*	.19 (.17) *.09*	.18 (.10) *.15*	.05 (.07) *.06*	.02 (.02) *.07*	.08 (.11) *.06*	.04 (.02) *.13*	.35 (.24) *.08***	.88 (.54) *.11***
H1	Scholastic Competence	.15 (.15) *.04***	.04 (.17) *.01***	.05 (.15) *.02*	.03 (.23) *.01***	.03 (.18) *.01**	.03 (.20) *.01***	.02 (.08) *.01*	.03 (.10) *.01**	.03 (.10) *.01*
H2	Social Acceptance	.18 (.15) *.04***	-.00 (-.02) *.01*	.01 (.02) *.02*	-.00 (-.00) *.01*	.02 (.11) *.01*	-.02 (-.13) *.01*	-.00 (-.01) *.01*	.02 (.05) *.01*	.01 (.02) *.01*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
H3	Athletic Competence	-.00 (.00) *.03*	-.00 (-.00) *.01*	.01 (.03) *.01*	-.00 (-.04) *.00*	.01 (.04) *.01*	-.00 (-.01) *.00*	.01 (.04) *,01*	-.00 (-.01) *.01*	.01 (.03) *.01*
H4	Physical Appearance	.39 (.49) *.03***	-.02 (.12) *.01**	-.01 (-.06) *.01*	-.01 (-.06) *.01*	-.00 (-.01) *.01*	-.00 (-.02) *.01*	-.00 (-.01) *.01*	-.01 (-.03) *.01*	.00 (.01) *.01*
H5	Job Competence	.01 (.01) *.04*	.01 (.03) *.01*	.01 (.02) *.02*	.01 (.07) *.01*	.01 (-.04) *.01*	.02 (.13) *.01**	-.01 (-.02) *.01*	.02 (-.06) *.01*	-.02 (-.07) *.01*
H6	Romantic Appeal	.05 (.05) *.04*	.01 (.03) *.01*	-.00 (-.01) *.02*	.00 (.02) *.01*	.00 (.02) *.01*	.00 (.01) *.01*	-.00 (-.01) *.01*	.00 (.02) *.01*	.00 (.00) *.01*
H7	Behavioural Conduct	.22 (.21) *.03***	.02 (.09) *.01*	.01 (.04) *.02*	.02 (.17) *.01***	.00 (.01) *.01*	.03 (.25) *.01***	.02 (.07) *.01*	.00 (-.02) *.01*	.05 (.15) *.01***
H8	Close Friendship	.02 (.02) *.03*	.00 (.01) *.01*	-.01 (-.03) *.01*	-.00 (-.02) *.01*	-.01 (-.04) *.01*	.01 (.07) *.01*	.01 (.03) *.01*	.00 (.00) *.01*	-.01 (-.04) *.01*
	Constant	1.89 (-) *1.31*	.66 (-) *.38*	1.83 (-) *.67*	.88 (-) *.28*	.21 (-) *.33*	1.00 (-) *.28***	-3.67 (-) *.47***	-2.27 (-) *.38***	-3.40 (-) *.51***
Self-Concept (First-Order)										
	Gender (male)	-.29 (-.03) *.35*	-.12 (-.05) *.09*	.28 (.08) *.16*	.14 (.11) *.06*	.10 (.06) *.08*	.01 (.01) *.06*	-.10 (-.03) *.11*	-.30 (-.11) *.09**	-.06 (-.02) *.12*
	Free school meals	-.45 (-.03) *.37*	.10 (.04) *.11*	.34 (.08) *.18*	-.01 (-.01) *.07*	-.12 (-.05) *.09*	.04 (.02) *.07*	-.07 (-.02) *.13*	-.08 (-.02) *.12*	-.16 (-.04) *.14*
	Special educational needs	-.57 (-.03) *.46*	.13 (.04) *.15*	.52 (.09) *.22*	.08 (.04) *.10*	.12 (.07) *.12*	.03 (.01) *.09*	-.02 (-.00) *.20*	-.11 (-.02) *.15*	-.02 (-.00) *.20*
	Low ACORN	-.31 (-.03) *.34*	-.15 (-.06) *.09*	.01 (.00) *.16*	.04 (.02) *.06*	.01 (.01) *.08*	.05 (.04) *.07*	-.46 (-.12) *.13***	-.13 (-.04) *.10*	-.22 (-.06) *.12*
	High ACORN	-.18 (-.01) *.43*	.11 (.03) *.11*	.07 (.01) *.19*	-.09 (-.05) *.08*	-.00 (-.00) *.11*	-.04 (-.02) *.09*	-.21 (-.04) *.15*	.23 (.06) *.09*	.12 (.03) *.13*
	KS3 Mathematics	-.32 (-.07) *.22*	.15 (.15) *.06*	.01 (.01) *.11*	.10 (.18) *.04*	.12 (.18) *.05*	-.05 (-.08) *.04*	1.00 (.66) *.08***	.16 (.12) *.07*	.22 (.15) *.08*
	KS3 English	-.22 (-.04) *.24*	.08 (.07) *.06*	.31 (.19) *.11*	-.04 (-.07) *.04*	.05 (.07) *.05*	.02 (.03) *.04*	.18 (.11) *.09*	.65 (.47) *.06***	.09 (.06) *.08*
	KS3 Science	.44 (.08) *.31*	.19 (.17) *.09*	.17 (.10) *.15*	.04 (.06) *.06*	.01 (.02) *.07*	.07 (.11) *.06*	.03 (.02) *.13*	.34 (.24) *.08***	86 (.53) *.10***

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
SC1	Physical Appearance Self-Concept	.45 (.53) *.03***	-.02 (-.10) *.01*	-.01 (-.04) *.01*	-.00 (-.02) *.01*	.00 (.01) *.01*	-.00 (-.01) *.01*	-.00 (-.01) *.01*	-.00 (-.02) *.01*	.00 (.02) *.01*
SC2	Close Friendship Self-Concept	.02 (.02) *.03*	.00 (.00) *.01*	-.01 (-.03) *.01*	-.00 (-.04) *.01*	-.01 (-.04) *.01*	.01 (.07) *.01*	.01 (.03) *.01*	.00 (.00) *.01*	-.00 (-.01) *.01*
SC3	Behavioural Conduct Self-Concept	.14 (.15) *.03***	.02 (.09) *.01*	.01 (.04) *.01*	.02 (.17) *.01***	.00 (.00) *.01*	.03 (.26) *.01***	.02 (.07) *.01*	.01 (.02) *.01*	.04 (.15) *.01***
SC4	Athletic Self-Concept	-.00 (-.00) *.03*	-.00 (-.00) *.01*	.01 (.03) *.01*	-.00 (-.04) *.00*	.01 (.05) *.01*	-.00 (-.02) *.00*	.01 (.04) *.01*	-.00 (-.00) *.01*	.01 (.03) *.01*
SC5	Job Self-Concept	.04 (.03) *.03*	.01 (.03) *.01*	.01 (.02) *.02*	.01 (.07) *.01*	.00 (-.01) *.01*	.01 (-.10) *.01*	-.00 (-.01) *.01*	-.02 (-.07) *.01*	-.02 (-.07) *.01*
SC6	Social Acceptance Self-Concept	.18 (.15) *.04***	.00 (.01) *.01*	.01 (.02) *.02*	.01 (.04) *.01*	.02 (.11) *.01*	-.02 (-.10) *.01*	-.00 (-.00) *.01*	.02 (.06) *.01*	-.00 (-.00) *.01*
SC7	Romantic Appeal Self-Concept	.01 (.01) *.02*	.00 (.00) *.01*	-.00 (-.02) *.01*	-.00 (-.04) *.00*	-.00 (-.01) *.01*	.00 (.01) *.00*	-.00 (-.01) *.01*	.00 (.02) *.01*	.00 (.00) *.01*
SC8	Scholastic Self-Concept	.18 (.17) *.04**	.04 (.18) *.01***	.05 (.15) *.02*	.03 (.24) *.01*	.03 (.18) *.01**	.03 (.22) *.01***	.02 (.08) *.01*	.03 (.11) *.01**	.03 (.10) *.01*
	Constant	2.20 (-) *1.35*	.67 (-) *.37*	1.89 (-) *,67*	.90 (-) *.28*	.30 (-) *.33*	1.06 (-) *.27***	-3.69 (-) *.45***	-2.28 (-) *.37***	-3.42 (-) *.50***
Self-Concept (Second-Order)										
	Gender (male)	.01 (.00) *.37*	-.12 (-.05) *.09*	.29 (.09) *.16*	.16 (.11) *.06*	.12 (.08) *.08*	-.00 (-.00) *.07*	-.12 (-.04) *.11*	-.29 (-.11) *.09*	-.08 (-.02) *.12*
	Free school meals	-.30 (-.02) *.42*	.10 (.03) *.11*	.33 (.08) *.18*	-.02 (-.01) *.07*	-.13 (-.06) *.09*	.05 (.03) *.07*	-.07 (-.02) *.13*	-.07 (-.02) *.12*	-.14 (-.03) *.14*
	Special educational needs	-.82 (-.05) *.49*	.13 (.03) *.15*	.49 (.09) *.22*	.07 (.03) *.10*	.14 (.05) *.13*	.05 (.02) *.09*	-.02 (-.00) *.20*	-.16 (-.02) *.16*	-.01 (-.00) *.20*
	Low ACORN	-.40 (-.03) *.37*	-.14 (-.06) *.09*	.02 (.01) *.16*	.04 (.03) *.06*	.02 (.01) *.08*	.06 (.04) *.07*	-.46 (-.12) *.13***	-.12 (-.04) *.10*	-.22 (-.06) *.12*
	High ACORN	-.32 (-.02) *.46*	.11 (.03) *.11*	.07 (.01) *.18*	-.08 (-.04) *.08*	-.02 (-.01) *.11*	-.01 (-.01) *.09*	-.22 (-.05) *.15*	.20 (.05) *.09*	.09 (.02) *.13*
	KS3 Mathematics	-.41 (-.09) *.25*	.16 (.16) *.06*	.02 (.02) *.11*	.11 (.19) *.05*	.13 (.19) *.05*	-.05 (-.08) *.04*	1.00 (.66) *.08***	.17 (.13) *.07*	.22 (.15) *.08**

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
	KS3 English	-.08 (-.01) *.26*	.07 (.06) *.06*	.30 (.18) *.11*	-.04 (-.06) *.04*	.05 (.07) *.05*	.02 (.03) *.04*	.18 (.11) *.09*	.64 (.46) *.06***	.09 (.06) *.08*
	KS3 Science	.37 (.07) *.34*	.20 (.18) *.09*	.20 (.12) *.15*	.04 (.06) *.06*	.01 (.02) *.07*	.08 (.12) *.06*	.04 (.02) *.13*	.35 (.24) *.08***	.85 (.52) *.10***
secSC1	Physical Self-Concept	.37 (.32) *.04***	.05 (.22) *.01***	.05 (.14) *.02**	.05 (.35) *.01***	.02 (.14) *.01*	.06 (.41) *.01***	.04 (.12) *.02*	.03 (.09) *.01*	.07 (.20) *.01***
secSC2	Scholastic & Behavioural Self-Concept	.44 (.45) *.04***	-.02 (-.08) *.01*	.00 (.01) *.01*	-.00 (-.04) *.01*	.01 (.09) *.01*	-.01 (-.04) *.01*	.00 (.03) *.01*	-.00 (-.00) *.01*	.01 (.04) *.01*
secSC3	Social Self-Concept	.18 (.13) *.05***	.01 (.02) *.01*	-.00 (.01) *.02*	-.00 (-.00) *.01*	.01 (.06) *.01*	.00 (.02) *.01*	.01 (.01) *.02*	.02 (.05) *.01*	-.01 (-.03) *.01*
	Constant	3.22 (-) *1.39*	.67 (-) *.34*	1.91 (-) *.60*	1.03 (-) *.25*	.35 (-) *.30*	1.15 (-) *.25***	-3.75 (-) *.41***	-2.56 (-) *.35***	-3.61 (-) *.48***
Self-Esteem										
	Gender (male)	-	-.17 (-.07) *.08*	.32 (.09) *.14*	.14 (.10) *.06*	.16 (.10) *.08*	-.01 (-.01) *.06*	-.11 (-.03) *.09*	-.31 (-.11) *.08***	-.03 (-.01) *.10*
	Free school meals	-	.10 (.03) *.11*	.30 (.07) *.18*	-.01 (-.00) *.08*	-.10 (-.05) *.09*	.06 (-.03) *.08*	-.05 (-.01) *.14*	-.04 (-.01) *.12*	-.11 (-.02) *.15*
	Special educational needs	-	.10 (.03) *.15*	.47 (.09) *.22*	.07 (.03) *.10*	.11 (.04) *.13*	.03 (-.01) *.10*	-.05 (-.01) *.20*	-.18 (-.03) *.16*	-.02 (-.00) *.19*
	Low ACORN	-	-.12 (-.05) *.10*	.03 (.01) *.16*	.07 (.05) *.07*	.02 (.01) *.08*	.08 (.06) *.07*	-.44 (-.12) *.13**	-.12 (-.04) *.10*	-.19 (-.05) *.12*
	High ACORN	-	.18 (.05) *.10*	.13 (.03) *.19*	-.02 (-.01) *.08*	.02 (.01) *.11*	.07 (.04) *.09*	-.15 (-.03) *.15*	.25 (.06) *.09*	.19 (.04) *.13*
	KS3 Mathematics	-	.15 (.16) *.07*	.02 (.02) *.11*	.13 (.23) *.05*	.15 (.21) *.05*	-.02 (-.04) *.05*	1.00 (.66) *.07***	.18 (.14) *.07*	.23 (.15) *.08*
	KS3 English	-	.11 (.09) *.06*	.31 (.19) *.11**	-.01 (-.01) *.04*	.07 (.09) *.05*	.07 (.10) *.05*	.19 (.12) *.09*	.66 (.48) *.07***	.11 (.07) *.08*
	KS3 Science	-	.26 (.24) *.09**	.26 (.15) *.15*	.06 (.10) *.06*	.01 (.02) *.07*	.11 (.16) *.06*	.09 (.05) *.12*	.37 (.26) *.08***	.93 (.57) *.11***
Self-Esteem		-	.01 (.05) *.01*	.01 (.04) *.01*	.02 (.13) *.01**	.01 (.10) *.01*	.01 (.08) *.01*	.02 (.06) *.01*	.01 (.03) *.01*	.03 (.08) *.01*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
	Constant	-	.93 (-) .30*	2.23 (-) .51**	1.18 (-) .21	.86 (-) .25	1.61 (-) .22**	-3.43 (-) .31**	-2.09 (-) .30**	-3.35 (-) .40**
Competency (First-Order)										
	Gender (male)	-.24 (-.02) .35	-.10 (-.04) .10	.33 (.10) .17	.17 (.12) .07	.12 (.07) .09	.01 (.01) .06	-.17 (-.05) .10	-.29 (-.11) .09*	-.16 (-.05) .12
	Free school meals	-.54 (-.04) .37	.09 (.03) .11	.33 (.08) .18	-.04 (-.02) .07	-.13 (-.06) .09	.02 (.01) .07	-.07 (-.02) .13	-.09 (-.03) .12	-.14 (-.03) .14
	Special educational needs	-.79 (-.04) .44	.08 (.02) .14	.48 (.09) .23	.02 (.01) .10	.14 (.05) .13	.02 (.01) .10	-.06 (-.01) .19	-.13 (-.02) .15	.00 (.00) .20
	Low ACORN	-.24 (-.02) .33	-.13 (-.05) .09	.03 (.01) .16	.05 (.03) .06	.01 (.01) .08	.08 (.05) .06	-.45 (-.12) .13**	-.10 (-.03) .10	-.19 (-.05) .12
	High ACORN	-.10 (-.01) .42	.13 (.04) .11	.10 (.02) .18	-.09 (-.05) .07	-.00 (-.00) .10	-.04 (-.02) .08	-.18 (-.04) .15	.24 (.06) .10	.18 (.04) .13
	KS3 Mathematics	-.28 (-.06) .23	.12 (.12) .06	-.01 (-.01) .11	.08 (.15) .04	.10 (.15) .05	-.04 (-.06) .04	.97 (.64) .07**	.18 (.14) .07	.25 (.17) .08*
	KS3 English	-.18 (-.03) .24	.10 (.09) .06	.34 (.20) .11*	-.03 (-.05) .04	.07 (.08) .05	.02 (.03) .04	.23 (.14) .09	.63 (.46) .07**	.10 (.06) .08
	KS3 Science	.31 (.06) .31	.17 (.15) .09	.08 (.05) .15	.02 (.03) .05	.01 (.01) .07	.07 (.10) .05	-.01 (-.00) .13	.37 (.26) .08**	.85 (.52) .10**
CY1	Self-Efficacy for Self-Regulated Learning	-.07 (-.05) .06	.03 (.10) 01	-.03 (-.07) .03	.03 (.17) .01*	.01 (.06) .01	.06 (.36) .01**	.03 (.07) .02	.05 (.14) .02*	.08 (.20) .02*
CY2	Athletics/Sports Competency	.01 (-.01) .03	-.00 (-.02) .01	.01 (.02) .01	-.01 (-.05) .01	.00 (.03) .01	-.00 (-.04) .01	.01 (.05) .01	.00 (.01) .01	.01 (.05) .01
CY3	Friendship Self-Concept	.15 (.11) .04*	-.00 (.00) .01	-.00 (-.01) .02	-.01 (-.05) .01	.01 (.03) .01	-.01 (-.04) .01	.02 (.04) .01	.01 (.04) .01	-.00 (-.01) .01
CY4	Physical Appearance Self-Concept	.46 (.51) .03**	-.02 (-.11) .01	-.02 (-.07) .01	-.01 (-.06) .01	.00 (.01) .01	-.00 (-.04) .01	-.00 (-.01) .01	-.00 (-.02) .01	.00 (.01) .01
CY5	Self-Regulatory Efficacy For Good Conduct	.02 (.02) .04	-.01 (-.03) .01	.03 (.07) .02	-.00 (-.01) .01	-.01 (-.07) .01	.01 (.07) .01	-.00 (-.01) .01	-.00 (-.00) .01	.00 (.01) .01
CY6	Job Self-Concept	.04 (.04) .03	.00 (.02) .01	.01 (.02) .02	.01 (.05) .01	.00 (.01) .01	.01 (.08) .01	-.00 (-.01) .01	-.02 (-.08) .01	-.02 (-.07) .01

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
CY7	Self-Assertive Efficacy	.07 (.05) .05	-.01 (-.02) .01	.00 (.00) .02	.00 (.01) .01	-.02 (-.08) .01	-.01 (-.06) .01	-.03 (-.07) .02	.02 (-.05) .01	-.01 (-.03) .02
CY8	Mathematics/Science Competency	.11 (.09) .05	.04 (.17) .04*	.08 (.22) .03*	.04 (.25) .01**	.03 (.15) .01	.02 (.13) .01	.04 (.12) .02	-.01 (-.02) .01	.01 (.02) .02
CY9	Communication/Performing Arts Self-Efficacy	-.05 (-.04) .05	.01 (.05) .01	.02 (.04) .02	.01 (.06) .01	.00 (.02) .01	-.00 (-.02) .01	-.03 (-.07) .01	-.01 (-.04) .01	-.06 (-.16) .01**
CY10	Good Conduct Competency	.32 (.27) .05**	.02 (.09) .01	.02 (.05) .02	.02 (.12) .01	.00 (.01) .01	.02 (.14) .01*	.03 (.07) .02	.01 (.02) .01	.05 (.14) .02*
	Constant	1.36 (-) 1.42	.44 (-) .40	1.38 (-) .73	.54 (-) .26	.25 (-) .34	.43 (-) .28	-3.60 (-) .48	-2.59 (-) .41**	-3.47 (-) .50**
Competency (Second-Order)										
	Gender (male)	.11 (.01) .36	-.04 (-.02) .09	.42 (.12) .16	.24 (.18) .06**	.16 (.10) .08	.08 (.06) .06	-.10 (-.03) .10	-.29 (-.11) .09*	-.03 (-.01) .12
	Free school meals	-.43 (-.03) .43	.07 (.03) .11	.30 (.07) .18	-.04 (-.03) .07	-.12 (-.06) .09	.01 (.01) .07	-.09 (-.02) .14	-.07 (-.02) .12	-.15 (-.03) .14
	Special educational needs	-.69 (-.04) .51	.07 (.02) .15	.49 (.09) .23	.03 (.01) .10	.12 (.05) .13	.01 (.00) .10	-.01 (-.00) .20	-.17 (-.03) .15	-.00 (-.00) .20
	Low ACORN	-.20 (-.02) .38	-.12 (-.05) .09	.06 (.01) .16	.06 (.04) .06	.02 (.01) .08	.09 (.06) .06	-.45 (-.12) .13*	-.12 (-.04) .10	-.20 (-.05) .12
	High ACORN	-.07 (-.00) .46	.14 (.04) .10	.09 (.02) .18	-.07 (-.04) .07	-.01 (-.00) .10	.00 (.00) .08	-.19 (-.04) .15	.22 (.06) .09	.16 (.03) .14
	KS3 Mathematics	-.19 (-.04) .25	.14 (.15) .06	.03 (.02) .11	.11 (.19) .04	.12 (.17) .05	-.04 (-.06) .04	.99 (.65) .07**	.16 (.13) .07	.24 (.16) .08*
	KS3 English	-.12 (-.02) .26	.08 (.07) .06	.29 (.17) .11	-.04 (-.06) .04	.06 (.07) .05	.02 (.03) .04	.20 (.12) .09	.65 (.48) .07**	.11 (.07) .08
	KS3 Science	.24 (.05) .34	.18 (.16) .09	.17 (.10) .14	.03 (.04) .05	.01 (.02) .07	.05 (.08) .05	.04 (.03) .13	.34 (.24) .08**	.85 (.52) .10**
secCY1	Academic Competency	-.00 (-.00) .06	.09 (.28) .02**	-.07 (.14) .03	.08 (.39) .01**	.05 (.19) .01**	.08 (.37) .01**	.03 (.07) .02	.04 (.09) .01	.03 (.07) .02
secCY2	Behavioural Conduct Competency	.32 (.25) .05**	.01 (.04) .01	.03 (.08) .02	.02 (.10) .01	-.01 (-.06) .01	.04 (.24) .01**	.03 (-.07) .02	.01 (.03) .01	.07 (.17) .01**

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
secCY3	Sports & Physical Appearance Competency	.49 (.47) *.04***	-.03 (-.11) *.01**	-.01 (-.04) *.02*	-.01 (-.11) *.01*	.01 (.04) *.01*	-.01 (-.11) *.01*	.01 (.03) *.01*	.00 (.00) *.01*	.02 (.06) *.01*
secCY4	Social Competency	.28 (.17) *.06***	.00 (.00) *.12*	.01 (.01) *.03*	.01 (.02) *.01*	.02 (.09) *.01*	.00 (.01) *.01*	-.01 (-.02) *.02*	.00 (.00) *.02*	-.04 (-.08) *.02*
	Constant	-.33 (-) *1.55*	.24 (-) *.37*	1.18 (-) *.68*	.30 (-) *.26*	.06 (-) *.33*	.29 (-) *.26*	-3.90 (-) *.46***	-2.53 (-) *.40***	-3.85 (-) *.54***
MSPSE / SPPA										
	Gender (male)	-.30 (-.03) *.34*	-.13 (-.05) *.09*	.25 (.07) *.16*	.16 (.12) *.07*	.09 (.05) *.08*	.00 (.00) *.06*	-.16 (-.05) *.10*	-.33 (-.12) *.09**	-.17 (-.05) *.12*
	Free school meals	-.42 (-.03) *.37*	.06 (.02) *.11*	.26 (.06) *.18*	-.06 (-.030 *.07*	-.13 (-.06) *.09*	.00 (.00) *.07*	-.11 (-.03) *.13*	-.09 (-.03) *.12*	-.18 (-.04) *.14*
	Special educational needs	-.51 (-.03) *.45*	.08 (.02) *.15*	.54 (.10) *.23*	.05 (.02) *.10*	.18 (.07) *.13*	-.02 (-.01) *.10*	-.02 (-.00) *.19*	-.11 (-.02) *.16*	.06 (.01) *.20*
	Low ACORN	-.28 (-.02) *.32*	-.14 (-.06) *.09*	.03 (.01) *.16*	.03 (.02) *.06*	-.00 (-.00) *.08*	.05 (.04) *.06*	-.43 (-.11) *.13**	-.12 (-.04) *.10*	-.20 (-.05) *.12*
	High ACORN	-.09 (-.01) *.42*	.13 (.04) *.11*	.05 (.01) *.18*	-.11 (-.05) *.07*	-.02 (-.01) *.11*	-.08 (-.04) *.08*	-.20 (-.04) *.16*	.26 (.07) *.10*	.14 (.03) *.14*
	KS3 Mathematics	-.24 (-.05) *.22*	.14 (.15) *.06*	.02 (.01) *.11*	.09 (.17) *.04*	.11 (.15) *.05*	-.04 (-.06) *.04*	1.01 (.67) *.08***	.17 (.13) *.07*	.27 (.18) *.08**
	KS3 English	-.33 (-.06) *.23*	.10 (.08) *.06*	.31 (.19) *.10**	-.04 (-.06) *.04*	.05 (.06) *.05*	.03 (.04) *.04*	.22 (.13) *.09*	.66 (.47) *.06***	.11 (.07) *.08*
	KS3 Science	.42 (.08) *.30*	.14 (.12) *.08*	.08 (.05) *.15*	.03 (.04) *.06*	.02 (.03) *.07*	.04 (.06) *.05*	-.01 (-.00) *.13*	.32 (.22) *.08***	.82 (.50) *.10***
B1	Self-Efficacy in Enlisting Social Resources	-.02 (-.01) *.06*	-.03 (-.09) *.01*	-.09 (-.19) *.03**	-.02 (-.13) *.01*	-.08 (-.04) *.01*	-.01 (-.07) *.01*	-.05 (.12) *.02*	-.01 (-.02) *.02*	-.04 (-.09) *.02*
B2	Self-Efficacy for Academic Achievement	-.03 (-02) *.07*	.06 (.19) *.02**	.07 (.16) *.03*	.04 (.18) *.01**	.03 (.11) *.02*	.04 (.19) *.01**	.01 (.03) *.02*	.00 (.01) *.02*	-.02 (-.05) *.02*
B3	Self-Efficacy for Self-Regulated Learning	-.04 (-.03) *.07*	.02 (.07) *.02*	-.04 (-.09) *.03*	.03 (.19) *.01**	.02 (.08) *.01*	.07 (.39) *.01***	.04 (.11) *.02*	.03 (.08) *.02*	.08 (.21) *.02**
B4	Self-Efficacy for Leisure-Time Skills & Extracurricular Activities	-.07 (-.06) *.05*	-.00 (.02) *.01*	.01 (.04) *.02*	.01 (.07) *.01*	-.01 (-.03) *.01*	-.01 (-.07) *.01*	-.03 (-.08) *.02*	-.02 (-.07) *.01*	-.05 (-.12) *.02**

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
B5	Self-Regulatory Efficacy	-.00 (-.00) *.05*	-.01 (-.04) *.01*	.03 (.07) *.02*	-.00 (-.02) *.01*	-.01 (-.07) *.01*	.01 (.09) *.01*	-.01 (-.02) *.01*	.01 (.02) *.01*	.02 (.04) *.01*
B6	Self-Efficacy to Meet Others' Expectations	.16 (.14) *.05**	.02 (.09) *.01*	.03 (.08) *.02*	-.00 (-.01) *.01*	-.02 (-.09) *.01*	-.01 (-.05) *.01*	.03 (.08) *.02*	.01 (.04) *.01*	.03 (.09) *.02*
B7	Social Self-Efficacy	-.01 (-.01) *.06*	.00 (.02) *.01*	.01 (.02) *.03*	-.01 (-.05) *.01*	.00 (.01) *.01*	-.01 (-.03) *.01*	.04 (.08) *.02*	.03 (.07) *.02*	.00 (.01) *.02*
B8	Self-Assertive Efficacy	.04 (.04) *.04*	-.01 (-.04) *.01*	.00 (.00) *.02*	.01 (.07) *.01*	.01 (.08) *.01*	-.00 (-.02) *.01*	-.04 (-.12) *.02**	-.01 (-.02) *.01*	-.01 (-.04) *.02*
B9	Self-Efficacy for Parental & Community Support	.03 (.02) *.04*	.01 (.03) *.01*	.01 (.03) *.02*	.00 (.04) *.01*	.01 (.05) *.01*	-.00 (-.03) *.01*	.01 (.04) *.01*	-.00 (-.01) *.01*	.01 (.03) *.01*
H1	Scholastic Competence	.14 (.13) *.04***	.12 (.08) *.01*	.04 (.12) *.02*	.01 (.11) *.01*	.02 (.12) *.01*	.01 (-.05) *.01*	.02 (.05) *.01*	.02 (.07) *.10*	.02 (.06) *.01*
H2	Social Acceptance	.19 (.16) *.04***	-.01 (.04) *.01*	.01 (.02) *.02*	-.00 (-.02) *.01*	.02 (.09) *.01*	-.03 (-.17) *.01**	-.01 (-.02) *.01*	.01 (.03) *.01*	.01 (.01) *.01*
H3	Athletic Competence	.02 (.02) *.03*	-.00 (-.01) *.01*	.00 (.00) *.01*	-.01 (-.08) *.01*	.01 (.05) *.01*	.00 (.01) *.01*	.02 (.08) *.01*	.01 (.03) *.01*	.02 (.09) *.01*
H4	Physical Appearance	.38 (.47) *.03***	-.02 (-.12) *.01*	-.02 (-.07) *.01*	-.01 (-.06) *.00*	-.00 (-.01) *.01*	-.00 (-.02) *.00*	-.00 (-.00) *.01*	-.01 (-.03) *.01*	.00 (.01) *.01*
H5	Job Competence	.01 (.01) *.04*	.01 (.02) *.01*	.01 (.03) *.02*	-.01 (-.06) *.01*	.01 (.03) *.01*	.02 (.12) *.01**	-.00 (-.01) *.01*	-.02 (-.06) *.01*	-.02 (-.07) *.01*
H6	Romantic Appeal	.04 (.04) *.04*	.00 (.02) *.01*	.00 (.01) *.02*	.00 (.00) *.01*	-.00 (-.02) *.01*	.00 (.03) *.01*	-.00 (-.00) *.01*	.00 (.01) *.01*	-.00 (-.00) *.01*
H7	Behavioural Conduct	.19 (.18) *.03***	.01 (.04) *.01*	-.00 (-.01) *.02*	.02 (.12) *.01*	.01 (.04) *.01*	.02 (.12) *.01*	.01 (.02) *.01*	-.01 (-.02) *.01*	.02 (.06) *.01*
H8	Close Friendship	.01 (.01) *.04*	.01 (.02) *.01*	.00 (.00) *.02*	-.00 (-.01) *.01*	-.01 (-.04) *.01*	.01 (.07) *.01*	.02 (.04) *.01*	-.00 (-.00) *.01*	-.01 (-.02) *.01*
	Constant	2.04 (-) *1.38*	.52 (-) *.41*	1.74 (-) *.77*	.61 (-) *.27*	.19 (-) *.37*	.50 (-) *.28*	-3.57 (-) *.48*	-2.49 (-) *.40***	-3.25 (-) *.52***
Self-Efficacy (First-Order) / Self-Concept (First-Order)										
	Gender (male)	-.45 (-.04) *.36*	-.09 (-.04) *.10*	.34 (.10) *.17*	.15 (.11) *.06*	.12 (.08) *.09*	.03 (.02) *.06*	-.17 (-.05) *.11*	-.29 (-.10) *.10**	-.13 (-.04) *.12*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
	Free school meals	-.51 (-.04) *.37*	.09 (.03) *.11*	.34 (.08) *.18*	-.03 (-.02) *.07*	-.12 (-.06) *.09*	.01 (.010 *.07*	-.05 (-.01) *.13*	-.09 (-.03) *.12*	-.14 (-.03) *.14*
	Special educational needs	-.41 (-.02) *.47*	.07 (.02) *.14*	.49 (.09) *.23*	.03 (.01) *.10*	.17 (.06) *.13*	-.00 (-.00) *.10*	-.10 (-.01) *.20*	-.09 (-.01) *.15*	-.01 (-.00) *.20*
	Low ACORN	-.29 (-.02) *.34*	-.14 (-.06) *.09*	.02 (.00) *.16*	.03 (.02) *.06*	.00 (.00) *.08*	.06 (.04) *.06*	-.47 (-.12) *.13***	-.12 (-.04) *.10*	-.23 (-.06) *.12*
	High ACORN	-.12 (-.01) *.43*	.14 (.04) *.11*	.12 (.02) *.18*	-.08 (-.04) *.07*	-.01 (-.00) *.11*	-.06 (-.03) *.08*	-.16 (-.03) *.15*	.22 (.06) *.09*	.13 (.03) *.13*
	KS3 Mathematics	-.24 (-.05) *.23*	.12 (.13) *.06*	.00 (.00) *.11*	.08 (.13) *.04*	.12 (.17) *.05*	-.05 (-.09) *.04*	.98 (.65) *.08***	.19 (.14) *.07*	.24 (.16) *.08**
	KS3 English	-.25 (-.05) *.24*	.10 (.09) *.06*	.32 (.19) *.11**	-.02 (-.04) *.04*	.05 (.06) *.05*	.04 (.06) *.04*	.23 (.14) *.09*	.63 (.46) *.06***	.12 (.08) *.08*
	KS3 Science	.37 (.07) *.31*	.15 (.13) *.09*	.08 (.05) *.15*	.02 (.03) *.06*	.02 (.02) *.07*	.05 (.07) *.05*	-.03 (-.02) *.13*	.36 (.25) *.08***	.81 (.49) *.10***
SF1	Self-Efficacy for Self-Regulated Learning	-.02 (-.02) *.06*	.02 (.06) *.01*	-.04 (-.10) *.03*	.03 (.17) *.01*	.01 (.06) *.01*	.06 (.37) *.01***	.02 (.06) *.02*	.04 (.11) *.02*	.07 (.18) *.02*
SF2	Self-Regulatory Efficacy for Good Conduct	.03 (.03) *.04*	-.00 (-.02) *.01*	.03 (.09) *.02*	-.01 (-.04) *.01*	-.01 (-.06) *.01*	.01 (.07) *.01*	-.00 (-.01) *.01*	.01 (.03) *.01*	.01 (.04) *.01*
SF3	Self-Assertive Efficacy	.05 (.04) *.05*	.00 (.00) *.01*	-.01 (-.02) *.02*	.01 (.03) *.01*	.02 (.11) *.01*	-.00 (-.02) *.01*	-.03 (-.07) *.02*	.01 (.04) *.01*	-.01 (-.02) *.02*
SF4	Sports Self-Efficacy	.00 (.00) *.04*	-.00 (-.01) *.01*	-.01 (-.03) *.02*	.01 (-.06) *.01*	-.02 (-.12) *.01*	.00 (.03) *.01*	.01 (.03) *.01*	-.00 (-.01) *.01*	-.00 (-.01) *.01*
SF5	Communication/Performing Arts Self-Efficacy	-.09 (-.07) *.05**	-.02 (-.06) *.01*	.03 (.07) *.02*	.01 (.05) *.01*	.01 (.06) *.01*	-.00 (-.01) *.01*	-.04 (-.11) *.01**	-.01 (-.03) *.01*	-.06 (-.14) *.01***
SF6	Social Self-Regulatory Efficacy	.11 (.08) *.06*	.00 (.00) *.01*	-.01 (-.02) *.02*	-.01 (-.06) *.01*	-.01 (-.03) *.01*	-.02 (-.09) *.01*	.02 (.05) *.02*	.01 (.02) *.01*	.01 (.02) *.02*
SF7	Mathematics/Science Self-Efficacy	.01 (.01) *.06*	.04 (-.16) *.01**	.06 (.16) *.03*	.03 (.20) *.01**	.01 (.05) *.12*	.02 (.12) *.01*	.05 (.12) *.02*	-.02 (-.06) *.01*	.02 (.04) *.02*
SC1	Physical Appearance Self-Concept	.44 (.52) *.03***	-.02 (-.11) *.01*	-.02 (-.06) *.01*	-.00 (-.03) *.00*	-.00 (-.01) *.01*	-.00 (-.01) *.01*	-.00 (-.01) *.01*	-.01 (-.03) *.01*	.00 (.01) *.01*

Table continued over the page…

Step / Structure		**Outcomes**								
		Self-esteem	**Educ asps**	**Occup asps**	**Mot 1**	**Mot 2**	**Mot 3**	**GCSE Maths**	**GCSE English**	**GCSE Science**
SC2	Close Friendship Self-Concept	.01 (.01) *.03*	-.00 (-.00) *.01*	-.01 (-.02) *.01*	-.01 (-.04) *.01*	-.01 (-.06) *.01*	.01 (.06) *.01*	.01 (.03) *.01*	.00 (.00) *.01*	-.00 (-.01) *,01*
SC3	Behavioural Conduct Self-Concept	.12 (.13) *.04**	.01 (.05) *,01*	.00 (.00) *.01*	.02 (.13) *.01*	.00 (.02) *.01*	.02 (.13) *.01**	.01 (.03) *.01*	-.00 (-.01) *.01*	.02 (.09) *.01*
SC4	Athletic Self-Concept	-.00 (-.01) *.04*	-.00 (.02) *.01*	.01 (.03) *.02*	-.01 (-.10) *.01*	.01 (.11) *.01*	-.00 (-.04) *.01*	.01 (.03) *.01*	-.00 (-.00) *.01*	.01 (.06) *.01*
SC5	Job Self-Concept	.03 (.03) *.03*	.00 (.02) *.01*	.01 (.02) *.02*	.01 (.06) *.01*	.00 (.00) *.01*	.01 (.09) *.01*	-.00 (-.00) *.01*	-.02 (-.09) *.01**	-.02 (-.07) *.01*
SC6	Social Acceptance Self-Concept	.17 (.13) *.05*	-.00 (-.01) *.01*	.01 (.02) *.02*	-.00 (-.01) *.01*	.02 (.09) *.01*	-.02 (-.14) *.01*	.00 (.00) *.01*	.01 (.04) *.01*	-.00 (-.01) *.01*
SC7	Romantic Appeal Self-Concept	-.00 (-.01) .02	.00 (.00) *.01*	-.00 (-.01) *.01*	-.00 (-.03) *.00*	-.00 (-.01) *.01*	.00 (.04) *.00*	-.00 (-.02) *.01*	.00 (.01) *.01*	-.00 (-.01) *.01*
SC8	Scholastic Self-Concept	.17 (.17) *.04***	.02 (.09) *.01*	.04 (.12) *.02*	.02 (.12) *.01*	.02 (.12) *.01*	.01 (.08) *.01*	.01 (.05) *.01*	.02 (.07) *.01*	.01 (.05) *.01*
	Constant	1.75 (-) *1.45*	.45 (-) *.40*	1.49 (-) *.74*	.62 (-) *.27*	.23 (-) *.36*	.56 (-) *.29*	-3.52 (-) *.46***	-2.53 (-) *.40***	-3.47 (-) *.50***
Self-Efficacy (Second-Order) / Self-Concept (Second-Order)										
	Gender (male)	-.09 (-.01) *.38*	-.08 (-.03) *.09*	.34 (.10) *.17*	.18 (.14) *.06**	.14 (.09) *.08*	.02 (.01) *.06*	-.12 (-.04) *.11*	-.28 (-.10) *.09**	-.08 (-.02) *.19*
	Free school meals	-.34 (-.02) *.41*	.08 (.03) *.11*	.30 (.07) *.18*	-.05 (-.03) *.07*	-.13 (-.06) *.09*	.00 (.00) *.07*	-.09 (-.02) *.13*	-.07 (-.02) *.12*	-.14 (-.03) *.14*
	Special educational needs	-.84 (-.05) *.48*	.12 (.03) *.15*	.50 (.09) *.22*	.07 (.03) *.10*	.15 (.05) *.12*	.04 (.02) *.10*	-.05 (-.01) *.20*	-.16 (-.03) *.15*	-.05 (-.01) *.20*
	Low ACORN	-.36 (-.03) *.37*	-.13 (-.05) *.09*	.04 (.01) *.16*	.06 (.04) *.06*	.02 (-.01) *.08*	.08 (.05) *.06*	-.46 (-.12) *.13***	-.11 (-.04) *.10*	-.22 (-.06) *.12*
	High ACORN	-.36 (-.02) *.46*	.15 (.04) *.10*	.10 (.02) *.18*	-.06 (-.03) *.07*	-.00 (-.00) *.11*	.01 (.00) *.08*	-.20 (-.04) *.15*	.21 (.05) *.09*	.11 (.02) *.13*
	KS3 Mathematics	-.31 (-.07) *.24*	.16 (.17) *.06*	.03 (.02) *.11*	.11 (.19) *.04*	.13 (.18) *.05*	-.03 (-.06) *.04*	1.00 (.66) *.08*	.17 (.13) *.07*	.24 (.16) *.08**
	KS3 English	-.07 (-.01) *.25*	.07 (. 06) *.06*	.30 (.18) *.11*	-.05 (-.07) *.04*	.05 (.06) *.05*	.02 (.02) *.04*	.19 (.11) *.09*	.64 (.46) *.06***	.10 (.06) *.08*

Table continued over the page…

Step / Structure		Outcomes								
		Self-esteem	Educ asps	Occup asps	Mot 1	Mot 2	Mot 3	GCSE Maths	GCSE English	GCSE Science
	KS3 Science	.30 (.06) *.33*	.16 (.15) *.09*	.17 (.10) *.15*	.02 (.04) *.05*	.01 (.02) *.07*	.05 (.08) *.05*	.02 (.01) *.13*	.33 (.23) *.08***	.81 (.49) *.10***
secSF1	Academic & Self-Management Efficacy	.23 (.14) *.07**	.05 (.14) *.02*	.04 (.09) *.03*	.04 (.20) *.01***	.00 (.00) *.02*	.08 (.36) *.01***	.06 (.12) *.02**	.03 (.07) *.02*	.09 (.19) *.02***
secSF2	Social Self-Efficacy	-.23 (-.16) *.07**	.03 (.10) *.02*	.03 (.06) *.03*	.03 (.15) *.01*	.03 (.12) *.01*	.00 (.02) *.01*	-.03 (-.07) *.02*	.01 (.02) *.02*	-.05 (-.12) *.02**
secSC2	Physical Self-Concept	.30 (.26) *.05***	.03 (.12) *.01*	.03 (.08) *.02*	.03 (.22) *.01***	.02 (.12) *.01*	.03 (.22) *.01***	.02 (.06) *.02*	.01 (.05) *.01*	.04 (.12) *.01**
secSC1	Scholastic & Behavioural Self-Concept	.50 (.52) *.04***	-.03 (-.14) *.01**	-.01 (-.04) *.02*	-.01 (-.13) *.01*	.00 (.03) *.01*	-.01 (-.09) *.01*	.01 (.05) *.01*	-.00 (-.02) *.01*	.02 (.08) *.01*
secSC3	Social Self-Concept	.20 (.15) *.05***	-.00 (-.01) *.01*	-.01 (-.02) *.02*	-.01 (-.05) *.01*	.01 (.04) *.01*	-.00 (-.02) *.01*	.00 (.01) *.02*	.01 (.04) *.01*	-.01 (-.03) *.01*
	Constant	2.91 (-) *1.42*	.21 (-) *.36*	1.45 (-) *.67*	.49 (-) *.25*	.16 (-) *.32*	.50 (-) *.26*	-3.92 (-) *.40***	-2.78 (-) *.35***	-3.81 (-) *.48***

Note: Educ asps–Educational aspirations. Occup asps–Occupational aspirations. Mot 1–Independent Mastery; Mot 2–Internal Criteria for Success; Mot 3–Preference for Challenge. *Indicates significance at p < .0042 (equivalent to a pre-Bonferroni criterion of p < .05). **Indicates significance at p < .0008 (equivalent to a pre-Bonferroni criterion of p < .01).

Appendix C.1 *Go For It!* Process Questionnaires

Go For It! Post-Test Process Questionnaire

Name________________________________ Date of Birth____________________

Please answer these questions about Go For It! (GFI) programme.

(For Questions 1-3 please circle the correct response. Use any number from 1 to 7).

1. Did you enjoy the Go For It! sessions?

7	6	5	4	3	2	1
Yes, very much		Yes, a bit		Not much		No, not at all

2. Do you think you learnt anything useful in the Go For It! sessions?

7	6	5	4	3	2	1
A lot, GFI was really useful		Something, GFI was quite useful		Not a lot, there wasn't much that was useful		Nothing, GFI was a waste of time for me

3. Do you think that Go For It! will help you make some positive changes in your school and home life?

7	6	5	4	3	2	1
Yes, definitely		Yes, probably		Probably not		Definitely not

4. In Go For It! you were taught how to write affirmations, i.e. a statement of something that you believe or want for the future. How often do you intend to write your affirmations?

Everyday	6	☐
Every few days	5	☐
Once a week	4	☐
Once a month	3	☐
Occasionally	2	☐
Not at all	1	☐

5. Here are a list of things that people say to themselves and others. Indicate whether each statement is an example of positive or negative talk.
(Put a tick in the appropriate box as shown)

	Positive	Negative
This lesson is a waste of time		
That's a really good idea		
I can do lots of things		
I have always found this subject difficult		
You'll never be any good		
I'm looking forward to this lesson		
I usually find this subject hard but this part is easy		
You're hopeless		
You really fancy yourself, don't you?		
Who is the teacher's pet then?		
There's no point doing Geography, it's not going to get me a job		
I want to be Prime Minister		

6. The Go For It! programme suggests that the following things are useful. How often are you likely to do them now Go For It! has finished?

	Very often 5	Often 4	Sometimes 3	Hardly ever 2	Not at all 1
Set goals for yourself					
Listen to your own self-talk					
Talk positively to yourself about how you want things to be					
Write your affirmations					
Read your affirmations					
Visualise your goals (see them in your mind)					
Avoid putting yourself down					
Avoid teasing others or putting them down					
Focus on solutions, rather than problems					

Go For It! Follow-Up Process Questionnaire

Name________________________________ Date of Birth____________________

Thinking back to the Go For It! (GFI) programme, which you completed a few months ago, please answer these questions about what you think of the programme now.

(For Questions 1-3 please circle the correct response. Use any number from 1 to 7).

1. Did you enjoy the Go For It! sessions?						
7	6	5	4	3	2	1
Yes, very much		Yes, a bit		Not much		No, not at all

2. Do you think you learnt anything useful in the Go For It! sessions?						
7	6	5	4	3	2	1
A lot, GFI was really useful		Something, GFI was quite useful		Not a lot, there wasn't much that was useful		Nothing, GFI was a waste of time for me

3. Do you think that Go For It! has helped you make any positive changes in your school and home life?						
7	6	5	4	3	2	1
Yes, definitely		Yes, probably		Probably not		Definitely not

4. In Go For It! you were taught how to write affirmations, i.e. a statement of something that you believe or want for the future. How often have you written your affirmations since Go For It! finished?

Everyday	6	☐
Every few days	5	☐
Once a week	4	☐
Once a month	3	☐
Occasionally	2	☐
Not at all	1	☐

5. Here are a list of things that people say to themselves and others. Indicate whether each statement is an example of positive or negative talk.
(Put a tick in the appropriate box as shown)

	Positive	Negative
This lesson is a waste of time		
That's a really good idea		
I can do lots of things		
I have always found this subject difficult		
You'll never be any good		
I'm looking forward to this lesson		
I usually find this subject hard but this part is easy		
You're hopeless		
You really fancy yourself, don't you?		
Who is the teacher's pet then?		
There's no point doing Geography, it's not going to get me a job		
I want to be Prime Minister		

6. The Go For It! programme suggests that the following things are useful. How often you have done them since Go For It! finished?

	Very often 5	Often 4	Sometimes 3	Hardly ever 2	Not at all 1
Set goals for yourself					
Listened to your own self-talk					
Talked positively to yourself about how you want things to be					
Written your affirmations					
Read your affirmations					
Visualised your goals (see them in your mind)					
Avoided putting yourself down					
Avoided teasing others or putting them down					
Focused on solutions, rather than problems					

Appendix C.2 Intervention Sample: Diagnostic Checks

Sample size requirements

MANOVA assumes that there should be more cases in each data cell than there are dependent variables (Pallant, 2007). Analysis of the descriptive statistics for each analysis revealed that the required number of cases in each cell was exceeded.

Outliers and normality

As all the variables were created from a finite set of scores (for example, 1 – 8 for the GCSE scores), and the data were screened for accuracy in the initial stages of the research, univariate outliers were not considered to be an issue. Prior to any analyses, all variables were screened for univariate normality; frequency histograms were examined and the variables were screened for skewness and kurtosis. Examination of the histograms revealed that a small amount of skew and/or kurtosis in a small number of the self-efficacy, self-concept and self-competence variables. However, none of the skewness/kurtosis values exceeded 2.3 and the majority were under 0.5. Normal probability plots run as an extra check on the appearance of these variables indicated that they were normally distributed. It was therefore not considered necessary to conduct any transformations prior to the main analyses. (The rationale for using the size of skewness/kurtosis values to examine univariate normally has been presented in Chapter 2).

Multivariate normality/outlier checks for the MANCOVA analyses were conducted using the procedure outlined by Pallant (2007) and Tabachnick and Fidell (2001). Mahalanobis distances[42] were calculated (using SPSS) for the dependent variables within each MANCOVA and the maximum value checked against a critical chi-squared value (determined using the number of dependent variables in the analysis as the degrees of freedom). As recommended in Tabachnick and Fidell, calculations were undertaken for the intervention and control group separately. These revealed a small number of cases within the self-concept, self-efficacy and self-competence analyses with values that exceeded the critical chi-squared value (between three and 11 cases depending on the self-perception variable or group). These values were not too far away from the critical value, however, and they were therefore left in the data file, in order to avoid reducing the size of the sample. It has been suggested that MANOVA is robust to violations to the assumption of

[42] Mahalanobis distance is the distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables (Tabachnick & Fidell, 2001).

multivariate normality when cell sizes are above 20, as they were here, and there are no univariate outliers (Garson, 2009). It was decided not to transform the data because it would make it harder to interpret and it would be difficult to compare findings to other literature using these measures (Tabachnick & Fidell, 2001).

Linearity between pairs of dependent variables

MANCOVA and repeated measure ANCOVA analyses assume linearity between pairs of dependent variables. Linearity was examined by generating a matrix of scatterplots between the pairs of dependent variables in each set of analyses. Following the recommendations of Tabachnick and Fidell (2001), because of the large number of dependent variables in the self-concept, self-efficacy and self-competence analyses, linearity was examined only for those variables that were likely to depart from normality, i.e. those that demonstrated some indication of skewness – defined here as any value over 1.0. The resulting scatterplots did not show any evidence of non-linearity. There was also no evidence of non-linearity in the self-esteem, educational aspiration, or occupational aspiration variables.

Multicollinearity and singularity

Within each analysis, the variables were independent, i.e. none were made up of other variables in the analysis. Therefore singularity was not an issue. Correlations between the dependent variables within each analysis were all under .8 (and most were under .5). Therefore collinearity was also not an issue (Pallant, 2007).

Homogeneity of variance and of variance-covariance matrices

Levene's Test of Equality of Error Variances (Levene, 1960) was used to examine homogeneity of variance (that the variances in each group are roughly equal). Levene's test was significant for a number of the self-perception, motivation and GCSE analyses, which indicated that the assumption of equality of variance was violated. However, as the sample sizes were reasonably similar (the largest divided by the smallest = 1.5 or less; Pallant, 2007) this was not considered a problem.

Homogeneity of variance-covariance matrices (that the correlation between any two independent variables is the same in all groups; Field, 2009) was tested using Box's Test of Equality of Covariance Matrices (Box, 1949). This test was significant (therefore violating the assumption; $p < .001$) for eight of the 54 initial MANCOVAs and repeated measures

ANCOVAs, including the analyses by gender. As Box's test is susceptible to deviations from multivariate normality, some evidence of violation of this assumption was to be expected. Field (2009) suggests that for larger sample sizes Box's test could be significant even when covariance matrices are relatively similar, and that when sample sizes are equal Box's test can be unstable. Tabachnick and Fidell (2001) suggest that when sample sizes are unequal and Box's test is significant at $p < .001$, then robustness is not guaranteed. They recommend that Pillai's criterion be reported instead of Wilks' Lambda. However, for all the analyses undertaken here, Pillai's and Wilks' values were the same. Therefore, Wilks' criterion was reported in all cases.

Sphericity

For repeated measures and univariate tests it is assumed that the covariance matrix formed by the dependent variables is spherical (circular) in form. This means that all pairs of levels of the within-subjects variable need to have equivalent correlations (Tabachnick & Fidell, 2001). Sphericity was examined using Mauchley's Test of Sphericity (Mauchley, 1940). For all the analyses, Mauchley's test indicated that the assumption of sphericity was not violated. Greenhouse-Geisser criterion (which does not assume sphericity) has been reported here for ease of reference, but note that all reporting criterion achieved the same results.

Influence of treatment on covariate measurement and reliability of covariates

Analyses using covariates require that the covariate is measured prior to the treatment or experimental condition, in order to avoid covariate scores being influenced by the treatment/intervention (Pallant, 2007). The covariates in this study were free school meals eligibility, ACORN score and KS3 Mathematics, English and Science. All were measured prior to intervention delivery. Analyses using covariates also assume that covariates are reliably measured. The covariates in this study were all measured using single item scores therefore it was not possible to determine their internal consistency reliability (Cronbach's Alpha). However, there is no reason to believe that they were unreliably measured.

Appendix C.3 ANOVA Summary Results

Table C.3.1 MANCOVA results for self-efficacy: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure		Interactions											
		Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		1.66	.098	.035	1.79	.069	.038	2.57**	.007	.054	2.59**	.006	.054
Univariate results													
B1	Enlisting Social Resources	5.25	.022	.013	7.64*	.006	.018	4.67	.031	.011	2.49	.115	.006
B2	Academic Achievement	5.57	.167	.005	4.91	.027	.012	0.49	.484	.001	1.11	.293	.003
B3	Self-Regulated Learning	0.64	.423	.002	0.06	.815	.000	0.39	.530	.001	0.22	.0636	.001
B4	Leisure-Time & Extracurricular Activities	2.94	.087	.007	2.97	.086	.007	0.02	.892	.000	0.02	.875	.000
B5	Self-Regulatory Efficacy	4.58	.499	.001	0.57	.451	.001	0.35	.556	.001	1.87	.172	.005
B6	Meet Others' Expectations	0.43	.835	.000	0.16	.694	.000	0.01	.937	.000	0.08	.776	.000
B7	Social Self-Efficacy	1.36	.245	.003	0.47	.492	.001	10.57*	.001	.025	9.94*	.002	.024
B8	Self-Assertive Efficacy	2.07	.151	.005	0.35	.552	.001	3.68	.056	.009	4.10	.044	.010
B9	Parental & Community Support	1.02	.312	.002	0.74	.392	.002	0.52	.470	.001	1.23	.268	.003
Baseline vs. follow-up													
Multivariate results		1.98*	.041	.042	1.85	.057	.040	0.88	.539	.019	1.09	.372	.024
Univariate results													
B1	Enlisting Social Resources	5.80	.016	.014	4.98	.028	.012	0.12	.728	.000	0.11	.744	.000
B2	Academic Achievement	0.42	.516	.001	1.32	.251	.003	0.02	.882	.000	0.02	.883	.000
B3	Self-Regulated Learning	0.01	.922	.000	0.27	.602	.001	0.09	.761	.000	0.80	.372	.002
B4	Leisure-Time & Extracurricular Activities	0.41	.525	.001	1.05	.307	.003	0.00	.958	.000	0.01	.922	.000
B5	Self-Regulatory Efficacy	9.32*	.002	.022	6.80*	.009	.016	0.42	.519	.001	0.27	.261	.003
B6	Meet Others' Expectations	0.00	.963	.000	0.08	.776	.000	1.81	.179	.004	1.03	.311	.002
B7	Social Self-Efficacy	3.35	.068	.008	1.87	.172	.005	0.89	.345	.002	0.58	.448	.001
B8	Self-Assertive Efficacy	1.16	.282	.003	0.06	.811	.000	4.96	.026	.012	5.53	.019	.013
B9	Parental & Community Support	0.10	.935	.000	0.00	.975	.000	0.55	.460	.001	1.93	.165	.005

Note: F-ratios are associated with 9 and 405 degrees of freedom for multivariate results, and 1 and 413 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$).

Table C.3.2 MANCOVA results by gender for self-efficacy: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)

Assessment period / Measure	**Interactions**											
	Females						**Males**					
	Time x condition			**Time x condition x SEN**			**Time x condition**			**Time x condition x SEN**		
	F-ratio	**Sig.**	**Partial η^2**	**F-ratio**	**Sig.**	**Partial η^2**	**F-ratio**	**Sig.**	**Partial η^2**	**F-ratio**	**Sig.**	**Partial η^2**
Baseline vs. post-test												
Multivariate results	2.31*	.017	.084	3.05*	.002	.108	1.73	.087	.086	1.38	.200	.070
Univariate results												
B1 Enlisting Social Resources	9.33*	.003	.038	7.93*	.005	.033	0.01	.944	.000	0.53	.470	.003
B2 Academic Achievement	1.67	.198	.007	4.47	.036	.019	0.03	.869	.000	0.36	.550	.002
B3 Self-Regulated Learning	0.00	.998	.000	0.04	.844	.000	0.76	.384	.004	0.20	.653	.001
B4 Leisure-Time & Extracurricular Activities	1.36	.245	.006	1.24	.267	.005	5.72	.298	.006	1.22	.270	.007
B5 Self-Regulatory Efficacy	1.05	.306	.004	2.80	.096	.012	0.03	.864	.000	0.09	.760	.001
B6 Meet Others' Expectations	0.00	.989	.000	0.16	.586	.001	0.01	.906	.000	0.00	.987	.000
B7 Social Self-Efficacy	3.12	.079	.013	4.38	.037	.018	7.99*	.005	.044	6.17	.014	.034
B8 Self-Assertive Efficacy	0.03	.858	.000	0.78	.378	.003	5.94	.016	.033	3.60	.059	.020
B9 Parental & Community Support	0.06	.809	.000	0.07	.790	.000	9.79	.283	.007	1.55	.214	.009
Baseline vs. follow-up												
Multivariate results	2.30*	.017	.084	3.03*	.002	.108	0.99	.452	.051	0.61	.791	.032
Univariate results												
B1 Enlisting Social Resources	1.83	.177	.008	1.27	.261	.005	2.57	.111	.015	2.44	.120	.014
B2 Academic Achievement	0.17	.685	.001	0.26	.613	.001	0.00	.998	.000	0.39	.533	.002
B3 Self-Regulated Learning	0.06	.802	.000	1.14	.288	.005	0.00	.957	.000	0.03	.854	.000
B4 Leisure-Time & Extracurricular Activities	0.28	.596	.001	0.47	.495	.002	0.06	.804	.000	0.38	.537	.002
B5 Self-Regulatory Efficacy	7.91*	.005	.033	8.15*	.005	.034	2.46	.119	.014	0.97	.326	.006
B6 Meet Others' Expectations	1.46	.229	.006	1.30	.256	.006	0.47	.492	.003	0.15	.701	.001
B7 Social Self-Efficacy	0.23	.629	.001	0.07	.792	.000	2.62	.107	.015	1.67	.198	.010
B8 Self-Assertive Efficacy	0.78	.379	.003	2.46	.118	.010	4.54	.035	.025	2.90	.091	.016
B9 Parental & Community Support	0.34	.559	.001	1.45	.230	.006	0.13	.724	.001	0.60	.441	.003

Note: *Females*: F-ratios are associated with 9 and 226 degrees of freedom for multivariate results, and 1 and 234 degrees of freedom for univariate results. *Males*: F-ratios are associated with 9 and 166 degrees of freedom for multivariate results, and 1 and 174 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$).

Table C.3.3 MANCOVA results for self-concept: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure		Interactions											
		Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		0.83	.578	.016	0.92	.498	.018	2.03*	.042	.038	2.02*	.043	.038
Univariate results													
H1	Scholastic Competence	0.77	.380	.002	0.38	.537	.001	6.37	.012	.015	5.38	.021	.013
H2	Social Acceptance	0.12	.725	.000	0.17	.682	.000	0.16	.691	.000	0.16	.686	.000
H3	Athletic Competence	1.31	.254	.003	3.02	.083	.007	0.51	.475	.001	0.35	.553	.001
H4	Physical Appearance	0.56	.453	.001	2.96	.622	.001	1.55	.214	.004	1.63	.202	.004
H5	Job Competence	2.81	.095	.007	2.50	.115	.006	6.43	.012	.015	4.65	.032	.011
H6	Romantic Appeal	0.04	.834	.000	6.53	.421	.002	0.15	.703	.000	0.28	.032	.001
H7	Behavioural Conduct	0.72	.395	.002	0.01	.910	.000	3.16	.076	.006	1.62	.203	.004
H8	Close Friendship	0.00	.965	.000	1.24	.265	.003	4.20	.041	.010	7.95*	.005	.019
Baseline vs. follow-up													
Multivariate results		0.92	.501	.018	2.38*	.017	.045	2.88**	.004	.054	2.97**	.003	.055
Univariate results													
H1	Scholastic Competence	0.05	.828	.000	0.12	.731	.000	4.02	.046	.010	3.78	.053	.009
H2	Social Acceptance	0.10	.750	.000	0.10	.750	.000	1.34	.247	.003	0.51	.475	.001
H3	Athletic Competence	2.20	.139	.005	4.62	.032	.011	0.31	.680	.001	0.82	.365	.002
H4	Physical Appearance	14.47**	.0005	.034	9.86*	.002	.023	2.18	.141	.005	2.13	.145	.005
H5	Job Competence	4.77	.030	.011	2.31	.129	.006	3.12	.078	.008	2.60	.108	.006
H6	Romantic Appeal	0.47	.495	.001	0.71	.400	.002	0.22	.638	.001	0.01	.913	.000
H7	Behavioural Conduct	3.57	.060	.009	1.98	.160	.005	7.70*	.006	.018	4.28	.039	.010
H8	Close Friendship	0.39	.535	.001	1.99	.159	.005	3.82	.051	.009	9.96*	.002	.024

Note: F-ratios are associated with 8 and 406 degrees of freedom for multivariate results, and 1 and 413 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.4 MANCOVA results by gender for self-concept: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)

Assessment period / Measure		Interactions											
		Females						Males					
		Time x condition			Time x condition x SEN			Time x condition			Time x condition x SEN		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		1.16	.323	.039	1.12	.348	.038	1.48	.167	.066	1.60	.129	.071
Univariate results													
H1	Scholastic Competence	6.57	.011	.027	4.79	.030	.020	1.31	.255	.007	1.31	.254	.007
H2	Social Acceptance	0.00	.972	.000	0.01	.944	.000	0.13	.714	.001	0.19	.661	.001
H3	Athletic Competence	0.06	.809	.000	0.79	.376	.003	1.12	.292	.006	1.90	.170	.011
H4	Physical Appearance	0.10	.750	.000	0.27	.606	.001	1.88	.172	.011	1.52	.220	.009
H5	Job Competence	0.43	.511	.002	0.24	.623	.001	7.42*	.007	.041	5.87	.106	.033
H6	Romantic Appeal	0.07	.799	.000	0.22	.637	.001	0.05	.829	.000	0.76	.385	.004
H7	Behavioural Conduct	0.79	.376	.003	1.42	.235	.006	2.53	.113	.014	0.68	.411	.004
H8	Close Friendship	2.44	.120	.010	1.75	.187	.007	1.58	.211	.009	5.65	.019	.031
Baseline vs. follow-up													
Multivariate results		1.52	.151	.051	1.42	.190	.048	3.72**	.001	.151	3.18**	.002	.132
Univariate results													
H1	Scholastic Competence	3.02	.084	.013	3.09	.080	.013	1.60	.208	.009	0.98	.323	.006
H2	Social Acceptance	1.25	.264	.005	0.52	.471	.002	0.14	.709	.001	0.16	.688	.001
H3	Athletic Competence	0.33	.566	.001	0.67	.415	.003	1.18	.278	.007	4.17	.043	.023
H4	Physical Appearance	3.14	.078	.013	1.86	.174	.008	0.53	.468	.003	9.43*	.002	.051
H5	Job Competence	0.07	.798	.000	0.07	.791	.000	1.75	.188	.010	4.03	.046	.023
H6	Romantic Appeal	1.00	.320	.004	0.47	.495	.002	12.25*	.001	.066	0.37	.546	.002
H7	Behavioural Conduct	0.54	.464	.002	0.33	.569	.001	6.25	.013	.035	5.60	.019	.031
H8	Close Friendship	1.83	.178	.008	2.87	.092	.012	0.01	.915	.000	7.03*	.009	.039

Note: *Females*: F-ratios are associated with 8 and 227 degrees of freedom for multivariate results, and 1 and 234 degrees of freedom for univariate results. *Males*: F-ratios are associated with 8 and 167 degrees of freedom for multivariate results, and 1 and 174 degrees of freedom for univariate results.
Multivariate results: **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.5 MANCOVA results for domain-specific (first-order) self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure		Interactions											
		Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		1.33	.210	.032	1.14	.331	.027	1.98*	.035	.047	2.14*	.021	.050
Univariate results													
CY1	Self-Regulated Learning Self-Efficacy	0.59	.443	.001	0.00	.996	.000	0.32	.569	.001	0.13	.716	.000
CY2	Athletics/Sports Competency	1.72	.191	.004	3.55	.060	.009	0.75	.388	/002	0.98	.323	.002
CY3	Friendship Self-Concept	0.07	.796	.000	0.89	.345	.002	2.92	.088	.007	5.19	.025	.012
CY4	Physical Appearance Self-Concept	0.06	.806	.000	0.06	.803	.000	1.70	.193	.004	2.07	.151	.005
CY5	Self-Regulatory Efficacy for Good Conduct	1.69	.195	.004	1.78	.184	.004	0.06	.815	.000	1.41	.236	.003
CY6	Job Self-Concept	2.10	.148	.005	2.34	.127	.006	10.97**	.001	.026	9.30*	.002	.022
CY7	Self-Assertive Efficacy	4.53	.034	.011	1.74	.188	.004	5.84	.016	.014	6.04	.014	.014
CY8	Mathematics/Science Competency	1.27	.261	.003	1.59	.207	.004	0.64	.423	.002	0.38	.541	.001
CY9	Communication/Arts Self-Efficacy	2.40	.122	.006	3.80	.052	.009	0.15	.698	.000	0.24	.624	.001
CY10	Good Conduct Competency	0.57	.451	.001	0.03	.863	.000	3.20	.074	.008	2.63	.105	.006
Baseline vs. follow-up													
Multivariate results		2.34*	.010	.056	2.02*	.030	.048	1.76	.066	.042	1.83	.053	.043
Univariate results													
CY1	Self-Regulated Learning Self-Efficacy	0.09	.924	.000	0.22	.642	.001	0.04	.833	.000	0.75	.388	.002
CY2	Athletics/Sports Competency	0.58	.449	.001	2.79	.096	.007	0.39	.532	.001	1.34	.248	.003
CY3	Friendship Self-Concept	0.45	.504	.001	1.55	.214	.004	0.55	.457	.001	3.71	.055	.009
CY4	Physical Appearance Self-Concept	7.71*	.006	.018	4.64	.032	.011	1.07	.302	.003	1.33	.250	.003
CY5	Self-Regulatory Efficacy for Good Conduct	10.21*	.002	.024	8.42*	.004	.020	0.14	.713	.000	1.26	.262	.003
CY6	Job Self-Concept	5.02	.026	.012	3.28	.071	.008	2.83	.093	.007	3.75	.054	.009
CY7	Self-Assertive Efficacy	2.53	.113	.006	0.73	.395	.002	3.08	.080	.007	3.16	.076	.006
CY8	Mathematics/Science Competency	0.43	.512	.001	0.24	.622	.001	0.58	.446	.001	1.44	.231	.003
CY9	Communication/Arts Self-Efficacy	2.26	.133	.005	3.34	.068	.008	0.78	.379	.002	0.64	.425	.002
CY10	Good Conduct Competency	2.55	.111	.006	1.67	.197	.004	10.40**	.001	.025	6.59	.011	.016

Note: F-ratios are associated with 10 and 404 degrees of freedom for multivariate results, and 1 and 413 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.6 MANCOVA results by gender for domain-specific (first-order) self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)

Assessment period / Measure		Interactions											
		Females						Males					
		Time x condition			Time x condition x SEN			Time x condition			Time x condition x SEN		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		0.98	.464	.042	1.52	.134	.063	2.10*	.027	.113	1.68	.089	.092
Univariate results													
CY1	Self-Regulated Learning Self-Efficacy	0.00	.947	.000	0.07	.787	.000	0.71	.402	.004	0.06	.802	.000
CY2	Athletics/Sports Competency	0.07	.794	.000	0.46	.498	.002	1.58	.210	.009	2.99	.086	.017
CY3	Friendship Self-Concept	1.34	.245	.006	1.10	.296	.005	1.23	.269	.007	3.56	.061	.020
CY4	Physical Appearance Self-Concept	0.43	.513	.002	0.53	.467	.002	1.39	.240	.008	1.59	.208	.009
CY5	Self-Regulatory Efficacy for Good Conduct	1.54	.216	.007	4.03	.046	.017	0.72	.399	.004	0.04	.836	.000
CY6	Job Self-Concept	2.02	.156	.009	1.54	.216	.007	9.53*	.002	.052	8.81*	.003	.048
CY7	Self-Assertive Efficacy	0.02	.902	.000	0.58	.447	.002	10.50**	.001	.057	7.28*	.008	.040
CY8	Mathematics/Science Competency	0.01	.925	.000	0.14	.713	.001	1.24	.267	.007	1.28	.260	.007
CY9	Communication/Arts Self-Efficacy	1.97	.162	.008	3.08	.081	.013	0.25	.621	.001	0.56	.454	.003
CY10	Good Conduct Competency	.088	.351	.004	1.80	.181	.008	2.46	.119	.014	1.26	.264	.007
Baseline vs. follow-up													
Multivariate results		2.35*	.012	.094	3.08**	.001	.120	2.23*	.018	.119	1.53	.133	.085
Univariate results													
CY1	Self-Regulated Learning Self-Efficacy	0.04	.843	.000	0.94	.333	.004	0.00	.966	.000	0.03	.858	.000
CY2	Athletics/Sports Competency	0.00	.959	.000	0.05	.817	.000	0.72	.396	.004	3.43	.066	.019
CY3	Friendship Self-Concept	0.10	.753	.000	0.68	.411	.003	0.30	.582	.002	3.15	.077	.018
CY4	Physical Appearance Self-Concept	1.82	.179	.008	0.82	.365	.004	6.81	.010	.038	5.18	.024	.029
CY5	Self-Regulatory Efficacy for Good Conduct	7.68**	.006	.032	9.94*	.002	.041	3.23	.074	.018	1.35	.247	.008
CY6	Job Self-Concept	0.10	.748	.000	0.15	.695	.001	5.77	.017	.032	5.44	.021	.030
CY7	Self-Assertive Efficacy	0.04	.838	.000	0.58	.448	.002	4.38	.038	.025	2.82	.094	.016
CY8	Mathematics/Science Competency	0.04	.843	.000	.042	.518	.002	0.62	.431	.004	1.04	.310	.006
CY9	Communication/Arts Self-Efficacy	4.16	.043	.017	4.97	.027	.021	0.01	.929	.000	0.16	.691	.001
CY10	Good Conduct Competency	1.86	.174	.008	1.27	.262	.005	9.93*	.002	.054	6.63	.011	.037

Note: *Females*: F-ratios are associated with 10 and 225 degrees of freedom for multivariate results, and 1and 234 degrees of freedom for univariate results. *Males*: F-ratios are associated with 10 and 165 degrees of freedom for multivariate results, and 1 and 174 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$. *Univariate results*: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.7 MANCOVA results for second-order self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure		Interactions											
		Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		1.13	.342	.011	1.27	.279	.012	3.83**	.005	.036	4.20*	.002	.039
Univariate results													
secCY1	Academic Competency	0.79	.376	.002	2.15	.144	.005	0.00	.955	.000	0.01	.920	.000
secCY2	Behavioural Conduct Competency	1.84	.176	.004	1.07	.303	.003	0.81	.370	.002	0.02	.894	.000
secCY3	Sports & Physical Appearance Competency	0.86	.355	.002	1.58	.209	.004	2.08	.150	.005	2.60	.108	.006
secCY4	Social Competency	3.50	.062	.008	3.61	.058	.009	14.23**	.0005	.033	15.18**	.0005	.035
Baseline vs. follow-up													
Multivariate results		3.87**	.004	.036	3.26*	.012	.031	1.66	.158	.016	2.00	.094	.019
Univariate results													
secCY1	Academic Competency	0.85	.357	.002	0.71	.401	.002	0.00	.979	.000	0.28	.597	.001
secCY2	Behavioural Conduct Competency	9.93*	.002	.023	7.66*	.006	.018	2.71	.101	.007	0.54	.463	.001
secCY3	Sports & Physical Appearance Competency	6.25*	.013	.015	6.42	.012	.015	1.26	.263	.003	2.25	.134	.005
secCY4	Social Competency	5.17*	.024	.012	3.86	.050	.009	4.24	.040	.010	7.53*	.006	.018

Note: F-ratios are associated with 4 and 410 degrees of freedom for multivariate results, and 1 and 413 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.8 MANCOVA results by gender for second-order self-competence: Baseline vs. post-test and Baseline vs. follow-up (N = 243 females; 183 males)

Assessment period / Measure		Interactions											
		Females						Males					
		Time x condition			Time x condition x SEN			Time x condition			Time x condition x SEN		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		0.75	.557	.013	1.16	.328	.020	3.74**	.006	.080	3.67*	.007	.079
Univariate results													
secCY1	Academic Competency	0.38	.536	.002	1.08	.299	.005	0.13	.717	.001	0.58	.449	.003
secCY2	Behavioural Conduct Competency	0.08	.780	.000	0.31	.580	.001	2.37	.125	.013	0.66	.419	.004
secCY3	Sports & Physical Appearance Competency	0.12	.728	.001	0.03	.857	.000	2.51	.115	.014	3.72	.055	.021
secCY4	Social Competency	1.90	.169	.008	2.25	.135	.010	13.99**	.0005	.074	14.73**	.0005	.078
Baseline vs. follow-up													
Multivariate results		0.52	.719	.009	1.18	.319	.020	4.01**	.004	.086	3.61**	.007	.078
Univariate results													
secCY1	Academic Competency	0.40	.530	.002	0.03	.863	.000	0.14	.708	.001	0.52	.471	.522
secCY2	Behavioural Conduct Competency	0.92	.339	.004	1.83	.178	.008	9.51*	.002	.052	5.24	.023	.029
secCY3	Sports & Physical Appearance Competency	0.98	.324	.004	0.65	.420	.003	5.84	.017	.032	7.48*	.007	.041
secCY4	Social Competency	0.00	.959	.000	0.81	.368	.003	6.85	.010	.038	8.84*	.003	.048

Note: *Females*: F-ratios are associated with 4 and 231 degrees of freedom for multivariate results, and 1and 234 degrees of freedom for univariate results. *Males*: F-ratios are associated with 4 and 171 degrees of freedom for multivariate results, and 1 and 174 degrees of freedom for univariate results.
Multivariate results: *Significant at $p < .05$. **Significant at $p < .01$.
Univariate results: Bonferroni corrections have been applied to the criterion for significance. *Significant at $p < .01$ (equivalent to a pre-Bonferroni criterion of $p < .05$). **Significant at $p < .002$ (equivalent to a pre-Bonferroni criterion of $p < .01$).

Table C.3.9 ANCOVA results for self-esteem, for full sample and by gender: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure	Interactions											
	Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test												
Full sample	0.56	.456	.001	0.06	.811	.000	0.03	.874	.000	0.06	.811	.000
Females	0.11	.736	.000	0.01	.936	.000	-	-	-	-	-	-
Males	0.32	.573	.002	0.09	.771	.000	-	-	-	-	-	-
Baseline vs. follow-up												
Full sample	4.14*	.043	.010	0.86	.353	.002	3.84	.051	.009	2.91	.089	.007
Females	0.01	.945	.000	0.29	.590	.001	-	-	-	-	-	-
Males	7.59**	.007	.042	3.36	.069	.019	-	-	-	-	-	-

Note: *Full sample*: F-ratios are associated with 1 and 413 degrees of freedom. *Females*: N = 243; F-ratios are associated with 1 and 234 degrees of freedoms. *Males*: N = 183; F-ratios are associated with 1 and 174 degrees of freedom. *Significant at $p < .05$. **Significant at $p < .01$.

Table C.3.10 MANCOVA results for intrinsic motivation: Baseline vs. post-test and Baseline vs. follow-up (N = 426)

Assessment period / Measure		Interactions											
		Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
		F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test													
Multivariate results		1.65	.178	.012	2.20	.088	.016	1.47	.223	.011	1.51	.212	.011
Univariate results													
Mot 1	Independent Mastery	3.82	.051	.009	2.78	.096	.007	1.42	.234	.003	1.12	.290	.003
Mot 2	Internal Criteria for Success	1.54	.216	.004	4.16	.042	.010	0.03	.857	.000	0.00	.969	.000
Mot 3	Preference for Challenge	0.01	.939	.000	0.03	.873	.000	1.49	.223	.004	1.90	.168	.005
Baseline vs. follow-up													
Multivariate results		0.62	.600	.005	0.74	.531	.005	0.10	.960	.001	0.35	.787	.003
Univariate results													
Mot 1	Independent Mastery	1.84	.175	.004	2.06	.152	.005	0.05	.831	.000	0.00	.968	.000
Mot 2	Internal Criteria for Success	0.08	.784	.000	0.47	.494	.001	0.26	.608	.001	0.56	.454	.001
Mot 3	Preference for Challenge	0.07	.786	.000	0.18	.669	.000	0.07	.796	.000	0.47	.494	.001

Note: F-ratios are associated with 3 and 411 degrees of freedom for multivariate results, and 1 and 413 degrees of freedom for univariate results.

Table C.3.11 ANCOVA results for educational and occupational aspirations, <u>for full sample and by gender</u>: Baseline vs. post-test and Baseline vs. follow-up

Assessment period / Measure	Interactions											
	Time x condition			Time x condition x SEN			Time x condition x gender			Time x condition x SEN x gender		
	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
Baseline vs. post-test												
Educational aspirations												
Full sample	2.90	.089	.007	3.70	.055	.009	5.11*	.024	.013	6.05*	.014	.015
Females	0.21	.648	.001	0.19	.663	.001	-	-	-	-	-	-
Males	7.62**	.006	.046	9.12**	.003	.054	-	-	-	-	-	-
Occupational aspirations												
Full sample	0.20	.652	.001	0.29	.594	.001	0.59	.445	.002	0.58	.446	.002
Females	0.46	.499	.003	0.48	.491	.003	-	-	-	-	-	-
Males	0.45	.504	.004	0.18	.673	.002	-	-	-	-	-	-
Baseline vs. follow-up												
Educational aspirations												
Full sample	5.51*	.019	.014	3.92*	.048	.010	0.19	.666	.000	0.20	.659	.001
Females	4.04*	.046	.018	3.30	.071	.015	-	-	-	-	-	-
Males	3.19	.076	.020	1.95	.165	.012	-	-	-	-	-	-
Occupational aspirations												
Full sample	2.60	.108	.009	1.43	.232	.005	2.55	.112	.009	2.66	.104	.010
Females	0.06	.804	.000	0.01	.933	.000	-	-	-	-	-	-
Males	5.34*	.023	.049	4.06*	.046	.038	-	-	-	-	-	-

Note:
Educational aspirations: *Full sample*: N = 399 (baseline/post-test); N = 397 (baseline/follow-up); F-ratios are associated with 1 and 386 degrees of freedom (baseline/post-test), and 1 and 384 (baseline/follow-up). *Females*: N = 231 (baseline/post-test); N = 228 (baseline/follow-up); F-ratios are associated with 1 and 222 degrees of freedom (baseline/post-test), and 1 and 219 (baseline/follow-up). *Males*: N = 168 (baseline/post-test); N = 169 (baseline/follow-up); F-ratios are associated with 1 and 159 degrees of freedom (baseline/post-test), and 1 and 160 (baseline/follow-up).
Occupational aspirations: *Full sample*: N = 299 (baseline/post-test); N = 285 (baseline/follow-up); F-ratios are associated with 1 and 266 degrees of freedom (baseline/post-test), and 1 and 272 (baseline/follow-up). *Females*: N = 183 (baseline/post-test); N = 172 (baseline/follow-up); F-ratios are associated with 1and 174 degrees of freedom (baseline/post-test), and 1 and 163 (baseline/follow-up). *Males*: N = 116 (baseline/post-test); N = 113 (baseline/follow-up); F-ratios are associated with 1and 159 degrees of freedom (baseline/post-test), and 1 and 104 (baseline/follow-up).
*Significant at p < .05. **Significant at p < .01.

Table C.3.12 Univariate ANCOVA results for GCSE performance, for full sample and by gender

Measure	Interactions											
	Condition			Condition x SEN			Condition x gender			Condition x SEN x gender		
	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2	F-ratio	Sig.	Partial η^2
GCSE Mathematics												
Full sample	0.16	.688	.000	0.75	.389	.002	0.21	.650	.001	0.95	.330	.002
Females	0.06	.808	.000	0.17	.684	.001	-	-	-	-	-	-
Males	0.21	.649	.001	1.33	.250	.008	-	-	-	-	-	-
GCSE English												
Full sample	0.01	.936	.000	0.77	.380	.002	2.96	.086	.007	1.74	.187	.004
Females	2.74	.099	.012	4.32*	.039	.019	-	-	-	-	-	-
Males	0.79	.375	.005	0.01	.911	.000	-	-	-	-	-	-
GCSE Science												
Full sample	1.10	.295	.003	0.20	.658	.001	0.72	.398	.002	1.13	.289	.003
Females	0.01	.943	.000	0.24	.627	.001	-	-	-	-	-	-
Males	1.37	.243	.009	0.91	.342	.006	-	-	-	-	-	-

Note:
GCSE Mathematics: *Full sample*: N = 422; F-ratios are associated with 1 and 409 degrees of freedom. *Females*: N = 241; F-ratios are associated with 1 and 232 degrees of freedom. *Males*: N = 181; F-ratios are associated with 1 and 172 degrees of freedom.
GCSE English: *Full sample*: N = 409; F-ratios are associated with 1 and 396 degrees of freedom. *Females*: N = 230; F-ratios are associated with 1 and 221 degrees of freedom. *Males*: N = 170; F-ratios are associated with 1 and 170 degrees of freedom.
GCSE Science: *Full sample*: N = 390; F-ratios are associated with 1 and 377 degrees of freedom. *Females*: N = 221; F-ratios are associated with 1 and 212 degrees of freedom. *Males*: N = 169; F-ratios are associated with 1 and 160 degrees of freedom.
*Significant at $p < .05$.

Appendix C.4 Calculating the *Go For It!* Process Score

The GFI process score was derived from the process questions administered to students at the follow-up testing session. In order to ascertain whether all six questions were appropriate to be used as one scale, principal components analysis (PCA) of the six questions was undertaken. The individual questions were first scored as outlined in Chapter 4. Then, prior to the PCA all questions were standardised to a common 12-point measurement scale so that they would all provide an equal contribution to the total. Therefore, scores for Questions 1, 2 and 3 were multiplied by 1.7143, scores for Question 4 were multiplied by 2, and scores for Question 6 were multiplied by 2.4. Scores for Question 5 were already on a 12-point scale.

Principal components analysis (using Varimax rotation) of the six questions indicated that all except one (Knowledge of self-talk; Question 5) loaded onto a single factor (a criterion of .30 was used for interpretation of the factor loadings)[43]. This question was not interpreted into the factor structure. The rotated component matrix is shown in Table C.4.1, together with the percentages of variance explained and the Cronbach's Alpha reliability (which achieved .80). These five questions subsequently formed the basis for the GFI process score. The final score was calculated by averaging the five question scores.

Table C.4.1 Principal components analysis of follow-up intervention process questions: Rotated pattern coefficients

Intervention process questions	Rotated component matrix	
	GFI process factor	Not interpreted
2. Learnt anything useful in the *Go For It!* sessions?	*.89*	-.03
3. Positive changes in school and home life?	*.86*	.11
1. Enjoy the *Go For It!* sessions?	*.83*	.03
6. Engagement with *Go For It!* strategies	*.66*	.10
4. How often write affirmations?	*.39*	.25
5. Knowledge of self-talk	.16	-*.85*
% variance explained	47.97	18.80
Reliabilities (Cronbach's Alpha)	.80	n/a

Note: Listwise deletion of data was used for the analyses: N = 170.
Factor coefficients ≥ .30 are italicised.

[43] Kaiser-Meyer-Olkin value = .733; Bartletts's Test of Sphericity = .000. These values supported the factorability of the data.